# ACADEMIC USE OF MOBILE TECHNOLOGY BY STUDENT ATHLETES AT A LARGE DIVISION I MIDWESTERN UNIVERSITY: A GROUNDED THEORY STUDY

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Nicole L. Kraft

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ACADEMIC USE OF MOBILE TECHNOLOGY BY STUDENT-ATHLETES AT A LARGE DIVISION I MIDWESTERN UNIVERSITY:

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NICOLE KRAFT

Approved:

_____
Diane Mason
Dissertation Chair

_____
Kaye Shelton
Committee Member

_____
Brett Welch
Committee Member

_____
Brett Welch
Director, Doctoral Program

_____
Diane Mason
Acting Chair, Department of Educational Leadership

_____
Robert Spina
Dean, College of Education and Human Development

_____
William E. Harn
Dean, College of Graduate Studies

ABSTRACT

ACADEMIC USE OF MOBILE TECHNOLOGY BY STUDENT-ATHLETES AT A LARGE DIVISION I MIDWESTERN UNIVERSITY: A GROUNDED THEORY STUDY

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The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and develop a theory about how they can more effectively incorporate those devices in their academic course work. A grounded theory study was chosen and research was conducted using interviews, combined with participant observations, to identify emerging patterns. Applying the results will help focus, facilitate, and implement, use of mobile devices for academic purposes among student-athletes. Voluntary sampling was used to select study participants from student-athletes who received an iPad from the university, were age 18 or older, and who had access to the iPad for at least one full semester. The theory that emerged from the data is entitled, "The theory of dependent learning for academic use of mobile technology." This theory describes how student-athletes are dependent upon formalized instruction in the academic use of technology to stimulate its classroom usage. This research study contributes to the field of study by discovering and describing perceptions student-athletes have about using iPad technology for academic purposes, and how they utilize those devices in their classwork.

*Keywords:* student-athletes, iPad, mobile technology, mobile learning, digital native

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# Chapter I

## Introduction

This grounded theory study examined the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, to develop a theory about how they can more effectively incorporate those devices in their academic course work. Student-athletes are provided an iPad for academic use upon enrollment in the university, but there is limited understanding of how—or even whether—they use the device for classwork. This study involved observation and interviews with a sampling of student-athletes to identify how they use their mobile technology, and to develop a theory about what may be done to enhance their academic engagement with mobile technology.

The incorporation of digital technology in teaching, such as with online learning, is forcing both the learners and teachers to engage technologically in ways they may not before have considered (Armstrong, 2011). The New Media Consortium's 2008 report found that more than two-thirds of the surveyed faculty believed that technological innovation would have a significant influence on teaching methodologies in the coming years (New Media Consortium, 2008). In 2012, the large Midwestern university provided nearly 1,000 student-athletes with a new iPad, with the idea they would serve as a single site for their academics, such as class notes, readings, assignments, submissions, and faculty and student interactions. Many student-athletes, however, told faculty-athletic representatives that they saw no use for the mobile devices beyond the use of native apps, social media, email, and viewing videos (J. Davidson, personal communication, Aug. 6, 2016). As a result, many of them did not utilize the devices at all, instead relying on

personal computers or computer labs (J. Davidson, personal communication, Aug. 6, 2016).

This chapter includes the background of the problem, the statement of the problem and the theoretical framework. In addition, it includes purpose of the study and research question, the rationale and significance of the research. Finally, this section includes assumptions, limitations and delimitations, definitions, and a summary and organization of the study.

**Background of the Problem**

In 2012, the university began to provide an iPad to all of its varsity student-athletes, in an effort to better emphasize and support academic goals, and responsibilities. At that time, the athletic director said that use of the iPad by more than 1,000 student-athletes would allow the university to find more innovative ways to enhance tutoring and mentoring services for the student-athletes (Perriatt & Brennan, 2012). It would also allow student-athletes to access digital versions of athletics department materials (Perriatt & Brennan, 2012). The move toward technology integration was also intended to allow student-athletes, whose generation is perceived as technologically savvy, to keep pace with the mainstream student body (Perriatt & Brennan, 2012). Very few of the student-athletes, however, used the iPad for academic purposes (J. Davidson, personal communication, Aug. 6, 2016). Many students claimed they saw little reason to use them over more conventional academic tools, such as notebooks, pens, and laptops (J. Davidson, personal communication, Aug. 6, 2016). This study aimed to use a grounded theory analysis to develop a theory as to how student-athletes utilize mobile technology for academic purposes.

**Statement of the Problem**

Students have been given access to technology in their class experiences. However, what they have not been taught is how to think of technology, especially the mobile technology that rarely leaves their possession, as an organic educational tool (Calvani, Fini, Ranieri, & Picci, 2012). The research problem looked at understanding perceptions of student-athletes at the large Midwestern university have about the relationship between mobile technology and academic engagement. Just because student-athletes have technology and are comfortable with it does not mean they use it as confidently for academics, as they do for social and personal interactions. (Sánchez, Salinas, Contreras, & Meyer, 2010).

The reason student-athletes are reluctant to use the iPad academically is difficult to ascertain (Attard, 2013). Failure to provide motivations behind academic engagement with the device often results in less student engagement with technology, and the iPad instead becomes more of a distraction (Attard, 2013). Even though students may be excited at the prospect of integrating mobile technology into their classroom experiences, comprehensive and clearly-articulated instructional design, along with personal comfort with how the technology can be used academically, are significant factors in student engagement (Armstrong, 2011). Students may have proficiency with mobile technology for socializing or entertainment, but they may not have the ability or comfort to adapt this knowledge to academic uses (Rossing, Miller, Cecil, & Stamper, 2012). The current generation of higher-education students may have been born surrounded by technology (Prensky, 2001a), but there is little research to show those students have the ability to move beyond the basic or personally gratifying uses of mobile technologies (Calvani et

al., 2012). Students instead need guidance and instruction in using mobile technology as part of their learning process (Calvani et al., 2012).

Current generations of college students regularly use mobile technology in their social life and in their communication (Cassidy et al, 2014). What has not been thoroughly investigated is how students use mobile technology for academic purposes. Thus, questions remain how mobile technology can become more and better integrated into fundamental aspects of learning in a higher-education setting, by helping students organize, understand, and complete academic assignments (Rosenthal & Eliason, 2015; Wardley & Mang, 2015).

The large Midwestern Division I university provided more than 1,000 athletes with an iPad at a cost of approximately $600 each. The idea was student-athletes would use the iPad as a single site for academics, class notes, readings, assignments and course submissions, as well as faculty, and student interaction. Student-athletes were, however, not provided instruction in how to use the iPad beyond their personal understanding of mobile technology, which often equated to native apps, social media, email, and viewing videos.

**Theoretical Framework**

Debate about student and technology interaction began with computer and Internet development (Selwyn, 2009). It was, however, Mark Prensky's (2001a) seminal work that outlined the idea of the digital native, proclaiming that this generation of learners thinks and processes information differently from previous generations (Prensky, 2001a). He considered millennial students to be native speakers of the digital language of computers and the internet (Prensky, 2001a). Much of Prensky's writing addressed the

technology-induced capacity of young people to "think and process information fundamentally differently from their predecessors" (Prensky, 2001a, p. 1). Prensky (2001a) contrasted these digital natives with digital immigrants, or those people who knew life before technology, and engaged it with a matured mind. Prensky was not the first to advance the idea, as four years earlier Don Tapscott (1997) used the term "net generation" to describe this same generational population. Prensky's (2001a) theory gained traction when it compared digital fluency to a language learned at birth versus one learned later in life. Native and learned languages are mapped to different parts of the brain, allowing for native skills to be recalled with more effectiveness, and he claimed the same was true of use of digital devices (Prensky, 2001a).

Support for Prensky's (2001a, 2001b) theory can be interpreted through a Pew Research report that revealed 57% of recent college graduates use a laptop, smartphone, or tablet computer in class (Anderson, 2015). Yet, most colleges and universities do not have universally applied guidelines for mobile device use during class (Parker, Moore, & Lenhart, 2011). With regard to pre-college age students, a 2015 Pew Research study showed that 92% of teens (13-17) report going online daily (Lenhart, 2015).

Educators are the ones who must adapt the most in Prensky's (2001b) view, as they are challenged to work with students who seek instant electronic gratification, and have been interconnected and networked most of their lives. Since those students have limited tolerance for lectures and step-by-step logic, the sage-on-the-stage methods that worked when teachers were students will not work for students now (Prensky, 2001b). Prensky (2001b) advocated that educators stop relying on methods that no longer work with a population weaned on technology.

However, Prensky's (2001a, 2001b) theory relied on anecdotes and perceived logic, and there has been far more research critical of his unsupported generalizations. Despite the prevalence of technology, it is far from uniform in the lives of young people (Gong & Wallace, 2012). It is critical that students have access to the latest computer technology, but students who are economically disadvantaged may have limited access to technology in their homes (Carstarphen, 2011). Those who cannot purchase a computer or pay for Internet access, and those attending schools that offer limited computer instruction, are on the less-advantaged side of what Dobbs (2000) called the great prosperity divide.

In truth, the technical competencies of the millennial generation might actually lag far behind those who adopted technology later in life (Gibson & Sodeman, 2014). Earlier generations may be more motivated to find maximum and appropriate use of technology (Lohnes & Kinzer, 2007). Technology-based social activities students engage in every day do little to prepare them to use technology in any meaningful academic way (Bennett & Maton, 2010).

Computers have existed for decades and have been in households long before the millennial generation, yet there have been technologic experts just as long in the form of gamers and hackers (Selwyn, 2009). One study revealed that the digital-native generation often needs more structure and guidance from teachers to go beyond the technology with which they are comfortable using for school or work productivity (Thompson, 2013). That means those students who use technology may actually be utilizing a narrower range of tools, and are not maximizing the learning potential of any specific instrument (Thompson, 2013).

Use of the internet as a first stop for information is a reality of many people who live in the digital age, regardless of their generation. But even among members of the same generation in different college majors, such as engineering and social work, technological usage varies dramatically (Margaryan, Littlejohn, & Vojt, 2011). Learning is much more individual, and the use of technology within that learning is also individual, as opposed to generational. Therefore, "It is time to put the digital natives discourse to rest and focus on digital learners" (Bullen & Morgan, 2011, p. 66).

The more educators can understand modern learners—no matter what the generation—the more potential there is to use technology to support learning platforms for all (Means, Toyama, Murphy, Bakia, & Jones, 2009). Additional empirical research is needed to understand how educating students in the use of modern technology can impact teaching and learning. There is limited research, thus far, on how academic instruction in mobile devices might increase engagement and achievement among learners. More specific attention must be drawn to academic training to foster a more constructive and focused use of mobile devices for learning, and to understand the long-term benefits of turning mobile devices from toys into tools in the higher-ed learning environment.

**Purpose Statement and Research Question**

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. The following open-ended research question guided this study:

RQ1. What theory emerged from the data to describe how student athletes at a large Division I Midwestern university develop an understanding about using mobile technology for academic purposes?

**Rationale and Significance of the Study**

There is a need for this type of in-depth qualitative analysis to advance the literature, and to help academia get closer to meeting the learning needs of a population. It will also focus pedagogical and educational energy to better using ubiquitous mobile technology for academic good and not distraction (Beetham & Sharpe, 2013). This study will help formulate a better understanding of how student-athletes conceptualize and utilize technology in higher education studies, with the goal of understanding what may be needed to enhance academic usage of mobile devices and augment academic performance.

**Assumptions**

Assumptions are those issues or items that are taken for granted relative to this study (Creswell, 2013). The researcher made several assumptions for this study.

- The student-athletes interviewed as a part of this grounded theory study would have some level of interest in their academic pursuits.
- Responses to the questions were given in an open and honest manner.
- Participants were representative of the student-athlete population at the large Midwestern Division I university, so generalizations could be derived from the results.
- Participants all have equal access to technology and an inherent desire to maximize their academic opportunities.

**Limitations and Delimitations**

Limitations are those factors that may affect the study and over which the researcher has no control (Creswell, 2013). For this study, the researcher chose to focus only on student-athletes at one large Division I university in the Midwest. This allowed the researcher to make determinations about this to the larger Division I student-athlete population, but it may not be applicable to student-athletes in Division II, Division III, or smaller private schools. Delimitations are factors that may affect the study that are controlled by the researcher (Creswell, 2013). For this study, student-athletes from a variety of sports were utilized for the sample population.

**Definitions**

- Digital native: Someone born or brought up during the time that digital technology has been prevalent, making them familiar with computers and the Internet from an early age (Prensky, 2001a).
- Digital immigrant: Someone born or brought up before digital technology became prevalent, who has developed skills and knowledge later in life (Prensky, 2001a).
- Digital literacy: Using technology to discover, evaluate, create, and communicate information (Visser, 2012).
- m-Learning: Learning that uses mobile devices as educational technology (Kearney, Schuck, Burden, & Aubusson, 2012).
- Mobile technology: Portable technology that utilizes applications to facilitate user-generated work and connect the user to the internet (Gross, 2010).

- Net generation: The first generation to grow up in the digital age (Tapscott, 1997).
- Student-athlete: An individual who is a full-time student and engages in intercollegiate sport (Kirk & Kirk, 1993).

**Summary and Organization of the Study**

In Chapter I, the researcher introduced the study. In Chapter II, the literature is reviewed. The methodology is explained in Chapter III. In Chapter IV, the findings are presented. A summary of the study, conclusions, implications for practice, and recommendations for further study are discussed in Chapter V.

# Chapter II

## Review of Related Literature

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. This chapter examines key areas of learning through mobile devices, specifically how students perceive technology in the educational framework, and what type of pedagogy might best serve this developing population. It also examines learning philosophies that will help readers understand how and why technology may play a significant role for today's learners.

This review describes, summarizes, evaluates, and clarifies current literature pertaining to student-athletes learning and the use of mobile devices for academics. This literature review describes the search methods used, as well as provides an historical account of mobile devices for academics. Six major themes were identified in the literature: characteristics of student-athletes, the digital native debate, mobile technology perspectives, mobile technology academic usage, mobile learning challenges, and theoretic considerations.

Each theme was additionally divided into various sub-topics to better organize, describe, and display the primary framework of this study, which is student-athlete use of mobile devices for academics. Evidence is presented exploring the consistencies and inconsistencies in the review of the literature, identified gaps in the literature, and offering a final conclusion related to the body of evidence supporting the need for the focus of this research study.

**Searching Methods**

This chapter reflects a literature review compiled mainly from databases contained in online library websites. The literature search used relevant research studies in the English language from 2007 to the current year. For the literature review to be comprehensive, the review also contains foundational research, theory development, and learning philosophies from earlier researchers before 2007. Many different combinations of terms were used to locate relevant and current research. The subsequent terms created the most significant literature sources: digital learning, mobile learning, mobile technology, student technology, classroom technology, education technology, mobile devices, seamless learning, digital native, and digital immigrant. In addition to the current research and journals discovered searching for the above topics, useful resources were uncovered from the citations in the acquired journal articles.

Table 1

*Summary of Literature Search Results*

| Topics | Number of Resources |
|---|---|
| Characteristics of student-athletes | 10 |
| Digital native debate | 22 |
| Historical background | 8 |
| Mobile learning challenges | 17 |
| Mobile technology academic usage | 27 |
| Mobile technology perceptions | 12 |
| Theoretical considerations | 18 |

**Historical Background**

Donald Tapscott coined the phrase "growing up digital" as the title of his book, and he called the youth growing up in this time period the Net generation (Tapscott, 1997, p. 1). To them, digital technology was as comfortable to use as a common household appliance, and he believed that culture would soon take over in society (Tapscott, 1997). Just over ten years later, it has become a high-speed world (Tapscott, 2008).

The rise of ubiquitous technology gave rise to technology in the classroom, dubbed instructional technology, and described by Malhotra (2002) as "hardware and software, tools, and techniques that are used directly or indirectly in facilitating, enhancing, and improving the effectiveness and efficiency of teaching, learning, and practicing marketing knowledge" (p. 1). Peterson, Albaum, Munuera, and Cunningham (2002) offered a similar definition: "Instructional technology includes electronic and non-electronic instruments, tools, and techniques that are used in the delivery of course materials and/or in a 'backroom' support capacity" (p. 9). Technology has now become a routine component of the classroom and educational processes in general (Buzzard, Crittendon, Crittendon, & McCarty, 2011).

As technology became more mobile, through phones and tablets, it permeated the classroom, and allowed learners to pursue education anytime and anywhere (Mottiwalla, 2007). Indeed, higher education must embrace mobile learning, where students may now access information and knowledge anywhere, anytime (Traxler, 2007). This is reflected in devices like laptops, tablets, and phones that students carry everywhere with them, and that they regard as user-friendly and personal (Traxler, 2007).

The use of classroom technology among college undergraduates has been accelerated through continued access to mobile devices and technological developments (Wardley & Mang, 2015). This access led to one-to-one computing (where every student has a device, instead of a shared computer lab environment) that allows students to learn whenever they are curious (Chan et al, 2006). University students now tap into various mobile applications, including social media, games, and videos to extend the learning process beyond the end of the school day (Project Tomorrow, 2014).

**Characteristics of University Student-Athletes**

University student-athletes have a unique culture and experiences that separate them from their more conventional peers, as their performances publicize the university, as well as entertains the campus community and beyond (Sylwester & Witosky, 2004). Division I student-athletes face all of the challenges of conventional students regarding social and academic adjustment to college, but student-athletes have added demands imposed by their sports (Comeaux & Harrison, 2011). Student-athletes are expected to spend much of their time on practices, travel, team meetings, and competitions, which often equates to more than 40 hours a week (Wolverton, 2008). That also includes mental and physical fatigue, and injuries that can afflict those who participate in college sports (Wolverton, 2008). Sedlacek and Adams-Gaston (1996) said this means educators must often be reminded that student-athletes are, in some ways, just like other students, but they happen to play a sport. In other ways, student-athletes are not simply traditional students in nontraditional circumstances; rather they are nontraditional students with their own culture (Sedlacek & Adams-Gaston, 1996).

Research has shown that student-athletes in high-profile sports (also known as revenue sports) may not perform as well academically as their counterparts in the general student body (Baker & Hawkins, 2016). This is a result of the significant time pressures they face related to their sport, and the travel that keeps them from the class environment (Baker & Hawkins, 2016). One theme that emerged in the literature on student-athlete academic development is the negative impact of athletic obligations have on personal, academic, and career development (Cox et al., 2004). Athletes are more likely than non-athletes to face problems with career maturity, developing clear educational plans, and adjusting to college (Watson & Kissinger, 2007).

Colleges and universities offer numerous support services and programs for student-athletes, but they have not consistently enhanced student-athletes' learning and personal development (Comeaux, 2007). Instead, many programs focus on maintaining academic eligibility (Knight Foundation Commission on Intercollegiate Athletics, 2001). Comeaux (2015) advocated universities provide academic support that takes into account the challenges of an athletic schedule, as well as support for athletic focus, and support for career development. Student-athletes are isolated from the general student body, particularly in season, which make it all the more important to provide external academic support in these areas (Comeaux, 2015).

To address the need for such academic support, athletic departments should develop programs tailored for student-athletes (Retig & Hu, 2016) that would foster active and collaborative learning. Gains in personal and social development for the high-profile student-athlete population are important (Retig & Hu, 2016). Active and collaborative learning opportunities would be especially useful in engaging student-

athletes and maximizing educational opportunities (Retig & Hu, 2016). The challenges put on student-athletes may mean they do not see the same educational outcomes as other students (Retig & Hu, 2016). Lower overall satisfaction and grades support the idea that are a distinct subpopulation of college students (Retig & Hu, 2016), and could benefit from programs designed and implemented just for them. The athletic demands on student-athletes mean they must be supported by engagement activities provided just for them, which will support learning and personal development (Comeaux & Harrison, 2011).

**Digital Native Debate**

Mark Prensky's (2001a) seminal work outlined the idea of the digital native, proclaiming that this generation of learners thinks and processes information differently from previous generations. Prensky considered millennial students to be native speakers (Prensky, 2001a) of the digital language of computers and the Internet. Much of Prensky's (2001a) writing addressed the technology-induced capacity of young people to think and process information differently than did their parents. Prensky (2001a) compared these digital natives to digital immigrants, or those people who knew life before technology, and engaged it with a developed mind. Prensky was not the first to advance the idea, as three years earlier came the term "Net generation" (Tapscott, 1997).

But Prensky's (2001a) theory gained traction when it compared digital fluency to a language learned at birth, versus one learned later in life. Native and learned languages are mapped to different parts of the brain, allowing for native skills to be recalled with more effectiveness (Prensky, 2001a). He claimed the same is true of use of digital devices (Prensky, 2001a). Digital natives not only use complex technological products with ease,

but also are comfortable multi-tasking (Prensky, 2001a) and communicating using visual images, such as pictures or videos taken with mobile devices (Berk, 2009). Digital natives search instead of memorize, locate information and answers questions quickly, and become bored quickly (Prensky, 2001a).

Support for Prensky's (2001a, 2001b) theory can be interpreted through a Pew Research report (Anderson, 2015), which revealed that 57% of recent college graduates use a laptop, smartphone, or tablet computer in class. However, most colleges and universities do not have universally applied guidelines for device use during class (Parker et al., 2011). Even more dramatic, a Pew Research report revealed that 92% of teens (13-17) report going online daily (Anderson, 2015). Some studies, however, indicate digital natives may not be as proficient in the use of technology as expected (Thompson, 2013, 2015)

Though the digital native debate has been ongoing for nearly two decades, it is still not exactly clear what skills they possess that are that different than digital immigrants (Kirk, Chiagouris, Lala, & Thomas, 2015). Students from different academic years make use of digital technologies during their academic lives differently, depending on the expectations placed on them (Akçayır, Dündar, & Akçayır, 2016). Selwyn (2009) said there were few ways in which the current digital native generation constituted a different learning population from previous generations. He added that the ways young people engaged with digital technologies were varied and did not always contrast with conventional portrayals of digital natives (Selwyn, 2009).

Eight years after Prensky's (2001a) seminal work, Bennett, Maton, and Kervin (2008) reflected on the "moral panic," that rises up amid every generational change (p.

775). Despite the prevalence of technology, it is far from uniform in the lives of young people, and that means that skill development is also inconsistent and varied. Palfrey and Gasser (2013) said calling digital natives a generation was an exaggeration, especially since only one billion of the six billion people in the world even have access to digital technologies. Palfrey and Gasser (2013) consider them instead a population.

**Faculty perspective.** Educators are the ones who must adapt the most in Prensky's (2001b) view, as they are challenged to work with students who seek instant electronic gratification and have been interconnected and networked most of their lives. Those students have limited tolerance for lectures and step-by-step logic; the sage-on-the-stage methods that worked when teachers were students will not work for students now (Prensky, 2001b). Prensky (2001b) called for educators to stop relying on methods that no longer work with the population weaned on technology. Mohammadyari and Singh (2015) found it is important to understand the role of individual attitudes toward technology, since technology-based learning depends on it.

Faculty, however, have a significant level of intimidation about digital natives, and assume student have technical skills that digital immigrant will not be able to match (Lieberman, 2017). This disparity means professors must be taught to apply digital tools they use in their personal lives in the classroom (Lieberman, 2017). Teachers should accept learners with their individual challenges, including cognitive and metacognitive knowledge and skills, and attitudes, and dispositions, rather than assume they are different because of technology use (Kirschner, 2015).

**Student mobile technology.** An EDUCAUSE report revealed a huge leap in college-age students using mobile technology, which showed changes from 1.2% in 2005 to 62.7% in 2010 (Smith & Caruso, 2010). One in three college students consider themselves early adopters of electronic devices (Pearson, 2015). College students' interest in using mobile technology for school work continues to grow, with 83% of students stating tablets will transform the way college students learn in the future (Pearson, 2015). College students believe tablets make learning more fun (79%), and help students perform better in class (68%) (Pearson, 2015).

One of the primary reasons for this perspective is the flexibility students have to embrace educational opportunities and material at any place and time (Martin & Ertzberger, 2013). Students have grown up with the idea they will find learning materials whenever and wherever they want (Martin & Ertzberger, 2013). Mobile technology opens the door for a new kind of learning that occurs when learners have access to information anytime and anywhere to perform authentic activities in the context of their learning (Martin & Ertzberger, 2013).

Research on user interactions with mobile technology contradicts this assumption, suggesting that not all individuals have the metacognitive skills to manipulate software to learn effectively (Van Nuland & Rogers, 2016). Depending on the population and its socioeconomic factors, frequency and extent of use of mobile technology will vary dramatically within populations (Virkus, 2008). Technology-based socialization activities that students take part in every day do little to prepare them to use technology in any meaningful academic way (Bennett & Maton, 2010).

Computers have existed for decades and have been in household use for more than 40 years (Walton, 2006). Technologic experts have existed just as long, in the form of gamers and hackers (Selwyn, 2009). Use of the Internet as a "first port of call" for information is a reality of many people who live in the digital age, regardless of their generation, driven more by circumstance and immersion than age (Helsper & Eynon, 2010, p. 509). That is seen even among members of the same generation in different college majors, such as engineering and social work, who vary dramatically in technological usage (Margaryan et al., 2011). Learning is much more individual, and the use of technology amid that learning is also individual, as opposed to generational, so, "It is time to put the digital natives discourse to rest and focus on digital learners" (Bullen & Morgan, 2011, p. 66).

**Mobile Technology Perceptions**

The positive perceptions around use of mobile technology are many. It allows students to be more flexible in accessing academic materials, which improves the learning experience (Nguyen, Barton, & Nguyen, 2014). The iPad is useful for note taking, highlighting texts, or taking pictures (Gong & Wallace, 2012). Regardless, many still considered mobile devices to be more for entertainment than education (Gong & Wallace, 2012). The compact nature of tablets, along with longer battery life, and the ability to facilitate handwriting and typing make the iPad far more useful than laptops (Mang & Wardley, 2012). Students also like the iPad for collaboration (Rossing et al., 2012). Students indicated that mobile technology was valuable for those who sought to learn at different learning paces (Rossing et al., 2012). Research by Flower (2014) examined the effects of an iPad on time-on-task for students with emotional/behavioral

disorders, and found iPad use increased time-on-task, compared to independent conditions. Teachers and students said they saw the iPad as a positive academic addition, and they enjoyed using the iPad, because they were able to immediately determine their accuracy through immediate feedback on the iPad (Flower, 2014).

Researchers have thrown specific support behind tablet technology, which proved nimble and accessible, and saved students considerable money as a textbook publishing platform (Ireland & Woolerton, 2011). Research by Culén and Gasparini (2011) showed evidence of major differences between elementary and higher-ed class utilization of tablets, which are tied to time pressure and lack of comfort. The pressure to get good grades and meet high academic demands seems to prevent students from exploring how to maximize use of the iPad (Culén & Gasparini, 2011). Despite the usefulness of the device, the study revealed that higher-ed students thought learning to use a tablet efficiently would take too much time, and they did not have the time or space for creativity (Culén & Gasparini, 2011).

The digital native fallacy is evident in the fact that students consider themselves competent users of mobile technology equipment and software applications, although they can often show little evidence to suggest their digital technologies enhance their learning (Aldhafeeri & Male, 2015). There is evidence that continual student use of contemporary digital tools for personal benefit may prevent them from recognizing how to use mobile technology for educational purposes (Buzzard et al., 2011).

A study by Calvani et al. (2012) revealed that most students could perform technical and procedural activities using computers and the Internet, but this should not lead to the conclusion that the new generation of students has developed sophisticated

technological abilities. In fact, searching for information often results in insufficient knowledge (Calvani et al., 2012). Peluso (2012) said media-driven sensationalism has moved education toward using technology in the classroom without any real sense of how to engage students meaningfully. That is a result of the way millennials have become engrossed in technology and social media within their everyday lives, relying on it for communication and expression (Peluso, 2012). Providing students with mobile devices does not implicitly mean they will be used to benefit them educationally (Peluso, 2012).

One key variable is the fact that internet skills and use among the net generation are often driven by socioeconomic factors (Hargittai, 2010). Research has shown students from more privileged backgrounds are often better informed about using technology for more activities than students who come from less affluent environments, who cannot afford technology (Hargittai, 2010). In addition, students who belong to populations that reflect lower socioeconomic status, such as women, Hispanics, African Americans, may exhibit less technological familiarity, and use technology less for online information-seeking activities (Hargittai, 2010).

According to a study by Tossell, Kortum, Shepard, Rahmati, and Zhong (2014), even those students who have access to mobile technology do not necessarily want to use it for academic use. Researchers distributed iPhones to students for a year to assess their academic value. Students initially perceived the smartphones as useful. However, the end of the study saw the phones as detrimental to learning outcomes, because they were such a distraction (Tossell et al., 2014). Researchers assumed and expected students, given a tool, would know how to use it, but the study showed that without guidance, devices

actually got in the way of learning (Tossell et al., 2014). This view was further supported by a South Africa study that revealed many students entering their first year at the University of Western Capetown came in with technology exposure, but still needed training on basic digital literacy skills to be successful at the university level (Moodley, 2005). A sample of 2,734 students (2,287 age 17-30; 74 age 30+; 372 who did not indicate an age, and one incorrect entry), showed that many students did not possess basic digital literacy skills, including navigating the Windows Operating System, identifying basic computer components, understanding basic software, desktop management, identification of virus alerts, and basic etiquette in a computer lab and online (Moodley, 2005).

The use of technology in higher education has also become a vicious cycle around rhetoric and policies that lead to device dissemination and expectations, but limited use in execution (Schneckenberg, 2009). The desire is there to use technology academically, but few consider why technology is being used, or how it might augment pedagogy (Schneckenberg, 2009). These challenges are not restricted to millennial-age learners. A study of 799 undergraduate and 81 postgraduate students in New Zealand compared students under 20, 20-30, and over 30 (Lai & Hong, 2014). It found that all generations across the age groups, equally, had limited understanding of the academic uses for digital technologies (Lai & Hong, 2014).

**Faculty perceptions.** The concept of Universal Design for Learners postulates that everyone has unique learning abilities and needs, so educators must be flexible and intuitive to meet needs of all students (Nepo, 2016). This can be promoted more easily with the use of technology in the classroom (Nepo, 2016). Faculty often has great

reluctance to use technology academically, due its own insecurities (Aldhafeeri & Male, 2015). Faculty members may, instead, claim student safety and limited validity of online data sources keep them from using devices (Aldhafeeri & Male, 2015).

The fact that mobile devices offer learning opportunity and potential distraction leads teachers and educators to display positive and negative attitudes (Forkosh-Baruch & Meishar-Tal, 2016). This is dependent upon their perception of the advantages and disadvantages of the technology for learning (Forkosh-Baruch & Meishar-Tal, 2016). Many teachers believe the benefits of using mobile technology in classes outweigh the disadvantages, but others are indifferent; they do not encourage uses of mobile technologies in class, but also do not prevent it (Forkosh-Baruch & Meishar-Tal, 2016). The more familiar teachers may be with academic use of technology, the more likely they are to accept or encourage it (Forkosh-Baruch & Meishar-Tal, 2016).

There is a strong positive correlation between using mobile technologies for personal learning and its use in teaching. The less participants utilized mobile technologies in learning, the less they used these technologies in their teaching (Lai & Hong, 2017). If instructors feel uncomfortable or unskilled in using devices for academics, they are more likely to resist usage, and instead use tools and pedagogy with which they are more comfortable (Balderaz & Rosenblatt, 2016).

Some believe that technology should be incorporated throughout the classroom regardless of the pre-existing assumption of educational services (Nepo, 2016). This would ensure that all students can be instructed with necessary accommodations (Nepo, 2016). There is, however, little research that reflects how teachers use the iPad to

augment learning and teaching, or whether the use of mobile devices indicates a long-term positive impact on student learning outcomes (Attard, 2013).

## Mobile Technology Academic Usage

It is clear from the ubiquitous nature of mobile devices across cultures that such technology is profoundly changing society (Bennett & Maton, 2010). There is also little doubt that academic technological advances require new approaches and practices across our culture (Wu et al., 2012). Education has been a key area for focus to see how students and faculty utilize technology (Wu et al., 2012).

**Student use.** The idea of student-centered learning may be attached to millennials, but it is actually a concept that can benefit all students (Lee & Hannafin, 2016). In a collaborative learning environment that follows constructivist principles, technology can be used to create a more connected environment that breaks learning free from the class walls (Keengwe & Georgina, 2013). The idea of personalized learning is modeled after the personal learner in Beer's Viable System Model (Johnson & Liber, 2008). It demonstrates how technology, used well, can let learners create and manage their own learning to maximize experiences and productivity (Johnson & Liber, 2008).

Personalized learning allows educators to meet the varying backgrounds related to infrastructure and past learning experiences (Su, Tseng, Lin, & Chen, 2011). The authors state specifically that personalized learning succeeds best with a pedagogy that builds digital skills and literacies equally among all learners equally (Su et al., 2011). This was evident in a study by Johnson and Liber (2008) around personalized learning environments that showed how technology challenges current ways of teaching and

learning, creating an environment where individual can have greater control over learning.

Pew Research (Anderson, 2015) on personalization and digital technologies noted that learners are already using technology to create their own personalized learning experiences in their everyday world outside the classroom. The research found that 92% of American adults own a mobile phone, and 68% have smartphones; 86% of 18-29-year-olds have a smartphone, as do 83% of those ages 30-49. Among households of $75,000 annually, 87% of residence have a smartphone (Anderson, 2015). But an iPhone and an iPad are not the same. Students live with phones, and they are often treated like an appendage (Fischman, 2011). There was, however, a backlash in some classes that required an iPad (Fischman, 2011).

A fundamental challenge for modern-day students is not only what they learn, but also how and when they learn. By 2010, mobile technology was affordable enough for most students to have and utilize the tools in academic and personal environments (Looi et al., 2010). Researchers began to advocate for mobile devices to shift learning from teacher-centered to student-centered (Looi et al., 2010). One approach was identified as seamless learning spaces (Looi et al., 2010) where students could learn whenever they are curious, and seamlessly switch between formal and informal learning environments. The idea was also present in the seminal work from Chan et al. (2006), who found that seamless learning implies students can learn whenever they seek information, in a variety of scenarios; they can switch from one scenario to another easily quickly, using the personal device. Scenarios include learning individually, with another student, in small groups, in large online community, with involvement of teachers, face-to-face, or at a

distance (Chan et al., 2006). This follows the idea that mobile learning is about increasing a learner's capability to physically move a personal learning environment as he or she moves (Laouris & Eteokleous, 2005).

Another approach looked at mobile learning, known as m-learning, (Kearney, et al., 2012) from a three-piece pedagogical perspective: authenticity, collaboration, and personalization. Authenticity considered opportunities for participatory learning; collaboration focused on the interconnected aspects of m-learning; personalization focused on student ownership over their education, and more autonomous learning (Kearney et al., 2012). An investigation into how teachers adopt mobile pedagogies revealed that even when mobile technology is incorporated into a class environment, it may not be used at it is perceived (Kearney et al., 2012). Teachers in one study thought their m-learning tasks were creative and engaging in areas including setting, task, and tool, but only 14% of the tasks took place outside of a formal school location (Kearney et al., 2012). Only 19% required student participation in real, community-based activities (Kearney et al., 2012). The teachers had the best of intentions, believing that mobile devices could make tasks more realistic and professionally focused, but the learning scenarios did not allow the learners to see the mobile devices as crucial to their success (Kearney et al., 2012).

Even studies compared over time have not shown a dramatic change in the way students perceive mobile devices for academics. One study compared 2006 data with research from 2015 and found students believe mobile learning was a key part of coursework, but it was the laptop that was the most sophisticated learning device in both populations (Davison & Lazaros, 2015). The study of 20,503 graduate and undergraduate

students showed 90% of respondents preferred laptops as mobile learning tools over all other technologies, followed by 60% smartphones and 45% for tablet devices (Davison & Lazaros, 2015). A study by Park, Lee, and Cheong (2007) confirmed that how easy to use a technology was perceived significantly impacted whether or not students would consider it academically useful.

Research by van der Ventel, Newman, Botes, and Goldberg (2016) revealed students seemed more focused using the iPad, and were able to have more complex communication and collaboration between groups. However, one of the biggest dangers when incorporating an iPad into a curriculum is seeking to use apps without instruction (van der Ventel et al., 2016). Every app has a learning curve, and without a clearly identified pedagogy, it may be more of a distraction (van der Ventel et al., 2016). Students said the iPad enhanced the experience of learning experience, but researchers did not see better learning outcomes (van der Ventel et al., 2016). That has made it difficult for early adopting educators to see how best to align and integrate the iPad within the academic programs and assignments (Nguyen et al., 2014).

**Faculty use**. The key is to help faculty evolve pedagogically to bring mobile devices into classrooms, and accommodate how the net generation sees their world (Geist, 2011). To get student buy in, faculty must incorporate technology into the teaching process, instead of making it an optional addendum (Rosenthal & Eliason, 2015). Students must be encouraged to be creative in using technology to create, share, and disseminate course content (Rosenthal & Eliason, 2015). To get faculty to engage in classroom use of mobile technology, administrators must find ways to assess and support faculty members' perception of their competency level, and clearly communicate the

value of the initiative in a context that is relevant to faculty goals (Irvin & Longmire, 2016). There also must be investments made to ensure the technological infrastructure is ready to support these innovations (Irvin & Longmire, 2016).

Further research has shown that students are more successful incorporating technology if faculty model technology usage as part of the academic process (Rosenthal & Eliason, 2015). Calvani et al. (2012) argued that even though higher-ed students are digital natives, there is little research on their ability to move beyond passive use of mobile technologies. Students may need guidance and demonstrations in using the technology as part of their learning process (Calvani et al., 2012). The biggest challenges were evident when the iPad is not integrated within a holistic teaching and learning (Nguyen et al., 2014). To realize the value of a mobile learning environment, educators must shift their pedagogical mindset, engage with technology in their planning and teaching, and take into account how students react to technology within various learning spaces (Sølvberg & Rismark, 2012).

Research by Morrison, Leah, Harvey, and Masters (2014) showed there is a tendency for institutions to issue devices to staff members and expect them to figure out how to use these devices on their own. The fact is academics also need pedagogical training and support from their institutions if they are going to embed technology into academic practices, or use it in the classroom in transformational ways (Morrison et al., 2014).

## Mobile Learning Challenges

As mobile devices continue to grow as part of the higher-education landscape, mobile computing devices present both opportunities and challenges to higher education institutions (Looi et al., 2010). Having desire and infrastructure does not necessarily lead to utilizing technology effectively to achieve learning outcomes (NIE, 2013). Despite the best of intentions utilizing mobile technology in education, there are significant challenges from the student, faculty, and administrative perspective.

**Student device challenges.** Utilizing classroom technology is not without its challenges. Students who multitasked on a laptop during a lecture scored lower on a test compared to those who did not multitask, and also distracted others in class enough to negatively impact their scores (Sana, Weston, & Cepeda, 2013). Students also may not have the ability to apply the critical thinking skills that allow them to adapt their technological familiarity to other devices and uses (Rossing et al., 2012).

Norwood (2012) mentioned that the increasing presence of iPods, cell phones, laptops, and iPads in the classroom sometimes distracts students from paying attention to lessons. This can hurt their ability to retain information being taught (Norwood, 2012). Mobile devices are good for viewing, reading, searching, and sharing readings, but the differences between tablets and laptops cause stress for students (Wieder, 2011).

Other challenges included anxiety, time considerations, and fundamental questions about expectations in the mobile learning environment (Psiropoulos et al., 2014). Those who successfully adopted mobile devices found a positive response to the technology, provided it had a concurrent pedagogy (Hargis, Cavanaugh, Kamali, & Soto, 2013). Comprehensive content and professional development resulted in student

engagement and collaboration (Hargis et al., 2013). Montrieux et al. (2014) noted growing interest in mobile technology is obvious, because it represents flexible, personal devices that could potentially support the learning process. Implementation of mobile technology in educational practice, however, remains relatively scarce, despite potential merits in learning (Montrieux et al., 2014). Training and support opportunities have helped students reach higher levels of competency using mobile devices for academic purposes, as they demonstrate enhanced skill levels, and a responsibility for their own learning (Psiropoulos et al., 2014).

A trial of tablets at Stanford University showed students found it to be a challenge to adapt the device to class work; they switched back to using laptops within weeks (Weider, 2011). Students were frustrated using the virtual keyboard, and expressed frustration with a technological learning curve; some felt they spent more time figuring out how to use the iPad and different apps than working on the lesson at hand (Rossing et al., 2012). These same students sought more instruction on the device before being compelled to utilize it, even though they recognized instruction and set-up time took away from class learning (Rossing et al., 2012).

**Student app challenges.** Rossing et al. (2012), found it essential to devote classroom time to acclimate students to the how devices can be used. Most successful mobile apps require no training, but some academic apps are less user-friendly than some popular apps (Rossing et al., 2012). The average undergraduate student and the less tech-savvy faculty member benefit equally from demonstrations and/or training (Cassidy et al., 2014). van Deursen, ben Allouch, and Ruijter (2014) looked at six schools in the Netherlands, each of which provided students a tablet PC, and found the tablets made

children less distracted by pencils, gum, books, or other materials, and allowed them to focus better on the assignment. The children also processed more work than they would have without using the tablet PC, and worked together more frequently (van Deursen et al. 2014).

**Training**. Wardley and Mang (2015) noted, students must see and understand how such tools will increase the student's self-efficacy. Educators must also make connections between academic learning and real-world applications, and help devices work for students of all engagement levels (Wardley & Mang, 2015). As one student expressed, "I think it is beneficial for looking up additional info that you don't understand when you are too shy to raise your hand for more clarification from the professor (Wardley & Mang, 2015, p. 1,729).

Students will almost universally abandon less familiar technology at points of stress. Weider (2011) discussed a study at the University of Notre Dame, in which students in a management class said the finger-based interface on glossy surface was not good for taking class notes and didn't allow them to mark-up readings. There were 39 of 40 students who put away the iPad in favor a laptop for the online final, because of concerns that the Apple tablet might not save their material (Weider, 2011).

**Faculty challenges.** Faculty, too, have frustrations with mobile devices. Falloon and Khoo (2014) found that student collaboration with digital devices did not improve students' thinking or under-standing. Other researchers found that students using mobile technology may be distracted, playing games, or surfing the internet during class (Hatakka, Anderson & Gronlund, 2013).

Some academics preferred to use other devices, like laptop and desktop, because of their limited knowledge of how to use the iPad (Aiyegbayo, 2014). They also receive little or no formal pedagogical support (Aiyegbayo, 2014). So, while there are a great many potentials and challenges surrounding the application of mobile learning, further study is appropriate and necessary (Gong & Wallace, 2012).

**Administrative challenges**. Challenges to iPad deployment come from more than just students and faculty limitations. Poor management and technological issues have led to some high-profile collapses of iPad initiatives, such as the $1 billion investment by the Los Angeles School District to provide an iPad to every student (Haßler, Major, & Hennessey, 2015). This project was a clear indication of failure, at the highest levels, to fully understand the implications of technological incorporation in school environments (Haßler et al., 2015). It is difficult for schools to assume teaching staff is ready to operate tablets upon introduction to the technology (Melhuish & Falloon, 2010). Specific technical issues include unstable apps and connectivity (Rossing et al, 2012), and there remains a concern about costs and the potential for technology to become quickly outdated (Gong & Wallace, 2012; Rossing et al., 2012).

## Literature Summary

The identification of digital natives by Mark Prensky (2001a, 200b) has, for the past 15 years, shaped technological use in education. It is Prensky's (2001a, 2001b) view that learners born amid technology are fluent in ways of a native language speaker. But research demonstrates that the digital native is a myth, and use of the term has constrained the constructive incorporation of technology in pedagogy (Margaryan et al., 2011). Instead of recognizing technology as a subject to be instructed and learned, it has

simply been handed to learners, often with less-than-productive results (Tossell et al., 2014). By tying in learning theories related to technology-infused pedagogy, researchers might start to understand how technology can best serve education and those being educated (Siemens, 2005). Researchers can look at the connection of learning to mobile technology that is ubiquitous to almost every learner, regardless of generation (Koehler, Mishra, & Cain, 2013).

**Summary**

In Chapter II, the researcher reviewed the literature relevant to the topic student-athletes and perceptions on academic technological use. The methodology is presented in Chapter III. In Chapter IV, the findings are presented. A summary of the study, conclusions, implications for practice, and recommendations for further study are discussed in Chapter V.

# Chapter III

## Methodology

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. This chapter presents a detailed rationale for using a grounded theory to analyze and develop a theory about student-athlete use of iPad technology for academics at a major Division I university in the Midwest.

The university provided an iPad to more than 1,000 athletes, hoping it would allow it to find more innovative ways to enhance tutoring and mentoring services for student-athletes, while concurrently providing students access to digital version of athletics department materials (Perriatt & Brennan, 2012). The move was also intended to allow student-athletes, whose generation is perceived as technologically savvy and comfortable digital natives (Prensky, 2001a), to keep pace with the mainstream student body (Perriatt & Brennan, 2012). Very few of the student-athletes, however, used the iPad for academic purposes, with many claiming they saw little reason to use them, when compared with more conventional academic tools like notebooks, pens, and laptops (J. Davidson, personal communication, Aug. 6, 2016).

Division I student-athletes, in general, continue to show less academic success than non-athletes, yet the reasons they struggle academically, when compared with non-athlete peers, are not well understood (Comeaux & Harrison, 2011). There is little research examining student-athlete perceptions of this technology for academic use, so

using grounded theory will help create a theory around those perceptions and add to the present body of knowledge (Glaser & Strauss, 1967).

First, this section provides the rationale for a qualitative, rather than a quantitative method of inquiry. Next, is an overview of grounded theory methodology, including an explanation of why it is the most appropriate methods for this study, and the theoretically considerations. This overview is followed by the research question and the context of the study, which outlines the university environment where the study was conducted. The research design section explains data collection, sampling techniques, and the interview process. It is followed by a defense of the study's evidence of quality and the epoché.

This grounded theory study intends to add rigorous research to the literature about student-athlete use of mobile technology for academics from the student-athlete's perspective. Its conclusions will also directly reveal student-athlete experiences concerning use of mobile technology for academic purposes at a large Division I Midwestern university with 36 teams and more than 1,000 athletes competing in Division I athletics. Understanding perceived beliefs about academic mobile technology use is a key factor in modifying or changing how such devices are utilized by student-athletes to support student-athlete academics, as well as student-athlete growth (Gibson & Sodeman, 2014). It is not meant to be evaluative or be judgmental of the participants. Rather, it is intended to understand participants' perceptions of the meaning of mobile technology in academics. The format will enhance their understanding of how to utilize mobile technology most effectively while engaging in academics.

## Research Methodology and Rationale

The research methods were designed to reveal the truths about student-athlete perceptions of and engagement with mobile technology usage for academics through extensive interviewing, in order to develop a theory about that usage. Understanding student-athlete beliefs, attitudes, perceptions of and engagement with mobile devices for academic use will inform the educational field on the impact such devices may have on student-athlete academic efficacy. The researcher used a grounded theory to better understand and develop a theory about how student-athletes utilize mobile technology in academic pursuits (Creswell, 2013). This type of research allowed for discovery of views, feelings, and intentions, as well as, the contexts within the framework of the student-athlete life (Charmaz, 2006). It permitted student-athlete voices and descriptions to provide the best insights for the study (Creswell, 2013).

**Grounded theory.** Grounded theory, developed by Glaser and Strauss (1967), seeks to construct theory about issues of importance in people's lives through an inductive process of data collection. The researcher has no preconceived ideas to prove or disprove. Rather, issues of importance to participants emerge from the research itself (Charmaz, 2016). Grounded theory is distinctive because of the way it studies processes and constructs theory by asking "why" questions (Charmaz, 2016).

This design used protocol questions to explore how student-athletes perceive the academic usefulness of the iPad, and what might impact their academic use. It used a purposefully selected group of student-athletes from a large Division I Midwestern university, and then analyzed collected data, and findings were interpreted. The grounded

theory method generates a theory by using induction and comparative analysis (Glaser & Strauss, 1967).

There are two grounded theory approaches: classic systematic (Glaser & Strauss, 1967; Corbin & Strauss, 2008), and constructivist (Charmaz, 2006). In classic systematic grounded theory, coding data is the fundamental tool used to uncover emergent theory from inquiry, including open, theoretical, and constant comparative (Glaser, 1992). Charmaz (2001) offered a contemporary revision on the theory and dubbed it constructivist grounded theory. The approach focuses on a more narrative view of the interviews and coding, which encourages a more literary writing style to reflect the experiences of the participants (2001).

Constructivist grounded theory is more flexible, as theories are constructed through the researcher's immersion in and analysis of the collected data (Milles, Bonner, & Francis, 2006). The research tool for this study was in-depth, face-to-face individual recorded interviews. Data was coded, with codes placed into categories and theoretical themes identified. Themes identified in the theoretical questions will frame the study (Milles et al., 2006; Charmaz, 2016).

Trustworthiness of this qualitative research study was established through credibility, transferability, dependability, and confirmability (Creswell, 2013). Peer debriefing was used to strengthen the validity and credibility of the study (Creswell, 2013). Methods of triangulation, and the use of interviews across a varied population supported verification and cross checking of the data (Creswell, 2013). A transparent

description of the research study including an outline of the research process, raw data, the development of codes, category development, and theoretical proposals were available (Miles & Huberman, 1984).

## Theoretical Considerations

This study incorporated theoretical perspectives to inform not only the interviews, but also the research process. This included looking at a sampling of technology learning theories. In addition, theories including connectivism, the Technological Pedagogical Content Knowledge Standards, Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology were examined to frame the research.

**Technology learning theories.** The incorporation of digital technology in teaching, is forcing the hand of both the learner and the teacher to engage in technological ways they may not before have considered (Cho & Littenberg-Tobias, 2016). The New Media Consortium's 2008 report found that nearly two-thirds of the surveyed faculty believed that technological innovation would have a significant influence on teaching methodologies in the coming years (New Media Consortium, 2008). That was confirmed in the 2017 New Media Consortium Report, which outlined that fluency in the digital realm must go beyond gaining basic technology skills. Instead, users must generate a deep understanding of digital environments, since it considered online, mobile, and blended learning foregone conclusions (New Media Consortium, 2017). However, research shows that students' perceptions of technological usefulness in a learning environment are directly tied to how much and how well a teacher advocates for its use (Gros, Garcia, & Escofet, 2012). Understanding how students learn is a key part of exploring how technology may benefit education, and how it might be approached

pedagogically (Thompson, 2013). Kivunja (2014) examined how people learn to frame the argument around digital natives, applying theories that included:

- Behaviorism: Learning occurs through a relationship between stimuli and related responses, and motivation is driven by rewards and punishments (Kivunja, 2014, p. 95);
- Cognitivism: Learning happens best when individuals reflect on and engage with what is happening around them (Kivunja, 2014, p. 96); and
- Constructivism: Learners construct knowledge and meaning from their experiences through these steps: engage, explore, explain, elaborate, and evaluate (Kivunja, 2014, p. 96).

**Connectivism**. To these theories, George Siemens (2005) added connectivism as "a learning theory for the digital age" (p. 1). It carries the constructivism theory further and links it to network-like connections, as Siemens (2005) believed learners recognize and interpret patterns, and learn through the connections and context of networks as they form. Regardless of whether someone was born amid technology or embraced it through life, technology has over the past two decades reorganized how humans exist as humans in the most basic ways through communication and learning. To Siemens (2005) learning is messy, and when it happens, the learner is not always in control of what is learned and how it's learned.

**Technological Pedagogical Content Knowledge Standards.** Further exploration of how technology shapes learning came from the development of the Technological Pedagogical Content Knowledge Standards (Mishra & Koehler, 2006). In their seminal work, the researchers proposed an education technology guidepost built upon on

Shulman's (1986) formulation of pedagogical content knowledge to better understand incorporating technology into pedagogy. TPCKS outlined how content and pedagogy can be merged to create a better understanding of a subject and enable the transmission of that understanding to students in a transformative way through teaching (Shulman, 1987). Mishra and Koehler (2006) sought to identify and explain knowledge that teachers needed to integrate technology into their teaching. They recognized that using technology in a pedagogically sound and thoughtful way requires greater knowledge than most teachers inherently possess (Mishra & Koehler, 2006). The researchers refuted the idea that technology can simply be inserted into the educational process, and instead posited that technology must be purposeful and comprehensively thought out (Mishra & Koehler, 2006).

**Technology Acceptance Model.** The Technology Acceptance Model (Davis, 1989) proposed that subjects presented with a new technology have specific factors that influence decisions about how and when they will use it. They include:

- Perceived usefulness: Defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320).
- Perceived ease of use: Defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320).

Based on this theory, if student-athletes do not clearly see the usefulness of the iPad, or they do not perceive the iPad will be easy to use, then it is likely they will decline to use the technology in favor of something else that fits both perceptions (Davis, 1989).

**Unified Theory of Acceptance and Use of Technology.** Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) identifies how users accept and use technology. Venkatesh et al. (2003) identified three expectancies to determine the likelihood of technology usage: (a) the perception that a device will improve job performance (Performance), (b) how easy the device is perceived to use (Effort), (c) belief adopting the new technology is important (Social) (Venkatesh et al., 2003). In addition, the theory outlined that students are influenced by such contributing factors as the belief that the technology comes with sufficient structural support (facilitating conditions), the perceived pleasure that comes from using the technology (hedonic motivation), if it feels like it is worth the money (price value), and how familiar students are when they start with the technology (experience) (Venkatesh et al., 2003; Venkatesh, Thong, & Xu, 2012). Researching these influences among the student-athlete population and addressing them within this training model has the potential to better understand their academic engagement with mobile technology.

## Purpose of the Study and Research Question

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. This research was conducted using interviews to identify emerging patterns. Saturation is key to theory development, and interviews were conducted until clear and finite patterns were identified (Creswell, 2013). Development of a grounded theory involves developing and presenting a theory in a narrative format, which includes anecdotal evidence from subjects. Applying the results

will help focus, facilitate, and implement use of mobile devices for academic purposes among student-athletes at a major Midwestern Division I university. The following open-ended research question guided this study:

> RQ1. What theory emerged from the data to describe how student athletes at a large Division I Midwestern university develop an understanding about using mobile technology for academic purposes?

The framework and protocol questions for this study (Appendix A) are centered on three themes:

1. What is the academic purpose of mobile technology for student-athletes?
2. What are student-athlete's perceptions of self-efficacy related to academic use of mobile technology?
3. How does use of mobile technology impact academic success for student-athletes?

**Research Design**

A grounded theory study was used to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. Grounded theory allows for the discovery of theory from data (Glaser & Strauss, 1967). Barney Glaser and Anselm Strauss first defined it in their 1967 book, "The Discovery of Grounded Theory." The researcher elected grounded theory as the method of analysis to discover patterns in the data and help the researcher generate a theoretical model of how student-athletes use mobile technology in learning (Strauss & Corbin, 1998). The researcher aimed to develop a

theory that can lead to better understanding and academic engagement with mobile technology. The researcher used constant comparison to analyze data, and ultimately compares interpretations of that data translated into codes and categories (Milles et al., 2006). This grounds the researcher's final theory in participant experiences (Strauss & Corbin, 1998). The integration and interrelationships of the categories form the basis of the grounded theory, which is then compared to previous literature to validate or show differences in current understanding (Kendall, 1999).

**Participants and Setting**

The context of this study is a major Midwestern university that competes in Division I athletics. The school has approximately 1,024 student-athletes competing in 36 sports. The 2016 athletic department budget was $169.9 million. In 2012, the university spent more than $700,000 to purchase an iPad for all of its student-athletes. That amount was increased to $900,000 in 2016 to include keyboards and styli.

Voluntary sampling was used to select study participants from the population of student-athletes who received an iPad from the university. An email was sent to all student-athletes seeking volunteers. Those who volunteered were stratified into team sports to select a representative sample from as many teams and genders as possible (Creswell, 2013). All participants in this study met the following selection criteria: (a) a student-athlete enrolled full-time at the university, (b) age 18 or older, (c) in possession of a university-provided iPad, (d) selected on a voluntary basis, (e) who had access to the iPad for at least one full semester. Any individual who did not meet the criteria was not a part of the study sample.

The population was then divided into gender and sport, with 20 interview participants selected to represent an even gender and sport-variety distribution from student-athletes who met the criteria and indicated an interest by signing and returning the Informed Consent Form. Criteria sampling assured participants had at least one full semester with the iPad, and may or may not have been instructed in iPad usage. Each participant received and signed a copy of the informed consent form (see Appendix E). The form included background information, intent of the study, procedures, voluntary nature of the study, risks and benefits of the study, information about compensation and confidentiality, and contact information. The sample did not include any vulnerable or protected populations, or any participants under the age of eighteen. Participant identity remains confidential.

**Data Collection**

Before the study was conducted, approval was obtained from Lamar University Institutional Review Board (#IRB-FY18-1). Written approval was obtained from the Faculty Athletics Representative (see Appendix F). Interview participants also signed a letter of informed consent (see Appendix E). These approvals ensured participants' privacy and safety. Prior to the approvals, there was a discussion with the athletics' administrators about the procedures, plans for dissemination of completed study, and ethical considerations affecting participation of the student-athletes (Hatch, 2002).

Participants' rights to privacy, confidentiality, and anonymity were explained prior to the interview session, in which participants had the opportunity to ask any questions about the study. The survey and interviews were conducted in accordance with the rights of the participants as outlined in the consent form (see Appendix E) and the

Lamar IRB (Appendix G). The participants were assured that no identifying information would be included in the study, all names were coded, and all research records were kept in a secure, locked location. The transcribed interviews did not have any identifying factors. Any personal and professional identifying items in the responses were deleted. The surveys were numbered and had no names attached. Survey participants signed and returned an Informed Consent Form (Appendix E) with their survey to indicate interest in participating in an individual interview.

The audio files from recorded interviews were immediately uploaded and secured on a password-protected laptop computer. Participants had the opportunity to request full access to their data at any time. All correspondence, transcriptions, recordings, and any other data collected will be saved electronically for a period of five years.

Data collection followed these steps: identifying a site and a sample, gaining access and establishing rapport, purposefully sampling, collecting data, recording information, resolving field issues, and storing data (Creswell, 2013). Data was collected through individual face-to-face interviews to identify perceptions of participant experiences (Charmaz, 2006; Creswell, 2013). Collection of data involved individual, recorded interviews where the student-athletes were asked fifteen open-ended questions (Appendix A) to explore their use of the mobile technology as academic tools and what they considered while utilizing them. The questions, categorized under three themes, were:

Theme 1. What is the academic purpose of mobile technology for student-athletes?

a. Describe your feelings about using the iPad since you received it?
b. Describe how you use your mobile technology on an average class day.

c. Describe me your average class session—how do you take notes, interact in class?

d. Explain the relevance of mobile technology is in your classwork.

e. Describe how you access course materials for your classes?

Theme 2. What are student-athlete's perceptions of self-efficacy related to academic use of mobile technology?

a. Why do you think the university athletics department gave you an iPad?

b. What were your first thoughts when your university athletic department mentioned you would be receiving an iPad?

c. What do you wish the university athletics department knew/understood about your feelings on the iPad that maybe it doesn't know/understand now?

d. How much and what kind of instruction did you receive when you got your iPad?

e. What, if any, training do you wish you had received?

Theme 3. How does use of mobile technology impact academic success for student-athletes?

a. What is one thing you wish the device could do that it can't?

b. What is the most useful aspect of the device for you personally?

c. What other technology, if any, might benefit you academically?

d. Describe what tools you use to do homework in your classes?

e. Share what you like best and least about using the iPad.

Student-athletes were interviewed in locations convenient to them, including the university's two tutoring sites, as well as classroom locates before and after class sessions.

As Creswell (2013) noted, the model for data collection was one of a "zigzag" process (p. 86) whereby the researcher gathers and analyzes field information, and then seeks more field information. The goal was to develop saturation of information in one area before developing new categories of research and approaching additional focus areas through the constant comparative method of data analysis (Creswell, 2013). Data collection took place over two months, September 2017 to November 2017. Initial data collection was used to generate categories, which was refined and verified through subsequent collection. As per the guideline of grounded theory research, data was collected and analyzed simultaneous and continuously throughout the study (Urquhart, Lehmann, & Myers, 2009). All participants were informed about how data were used, how codes were used to protect confidentiality and anonymity, and how the data would be stored for five years.

Twenty individual face-to-face interviews were scheduled and conducted at times convenient for each participant. Choice of times included before school, after school, or on weekends. The researcher was the only interviewer. An iPhone and iPad were used to record the interviews, and an iPad was used for handwritten observations and to write down follow-up questions during the interview. Participants were advised that participation in the study was strictly voluntary and confidential. The interviews were transcribed for content analysis.

The participants responded to 14 primary open-ended interview questions, that were augmented by prompts and follow-up questions to obtain rich descriptive data (Rubin & Rubin, 2005). The question categories were aligned with the study's research question, and included student-athlete perceptions about academic use of mobile technology, self-efficacy in using mobile technology for academics, and student achievement using mobile technology for academics (Appendix A). The individual face-to-face interviews were conducted in a private area to maintain confidentiality and comfort. Participants were advised that the individual interview would take between 20 to 30 minutes.

**Treatment of the Data**

There are three basic steps in grounded theory data analysis: sort data into themes, combine related categories into a central category, and then develop and present theoretical propositions (Creswell, 2013). Coding allows the researcher to move statements to interpretations, which is the framework for analysis. Open and axial coding were used to analyze the data and develop theoretical propositions (Charmaz, 2006; Creswell, 2013). According to Charmaz (2006), data, codes, and categories were constantly compared in order to refine and advance overall understanding.

The interviews were open coded to identify a set of emergent preliminary categories and their properties (Creswell, 2013). Codes were initially broad and basic, and became more specific as data were added. The main purpose of axial coding is to conjoin data as it is identified into themes (Corbin & Strauss, 2008). Through axial coding, similar categories from the open coding process were combined to form core categories and subcategories. Interactions and relationships between categories and

subcategories were identified (Creswell, 2013; Strauss and Corbin, 1998). This included causal relationships, contextual conditions, participants' actions and interactions, and outcomes of these actions and interactions (Creswell, 2013; Strauss & Corbin, 1998). Microsoft Excel was used to categorize the transcribed notes into a coding process and highlight common ideas with the coordinated color.

**Provisions of Trustworthiness**

Trustworthiness was established in this study by utilizing triangulation, as well as member checking, and an epoché. The researcher used individual face-to-face interviews to encourage a comprehensive analysis of the data (Mays & Pope, 2000). The research question were also crafted to ensure they aligned with the goals of the research (Creswell, 2013).

**Epoché**. Practicing the Epoché means a researcher sets aside personal experiences so that the focus can be directed to the participants in the study (Creswell, 2013). I began the Epoché process by reflecting and writing down any biases and preconceptions that I had about the research idea and participants. As an Apple Distinguished Educator and a professor who incorporates technology into every class experience, I am well versed in the use of academic mobile technology. I have taught, researched, and published on the academic use of the iPad, which could have led me to assumptions about students' experiences and understanding of academic iPad engagement. My assumptions and paradigm were largely influenced by my personal experiences, and my belief in technology as potentially beneficial to academic understanding and engagement. In addition, I have worked with student-athletes to train them in the academic use of iPad technology, and could not let my experiences with those athletes or my bias toward the

advantages of such training influence the questioning or analysis in this study. As a member of the university faculty, I have interests, feelings, and opinions that influenced my decision to study this topic, including my interest in the student-athlete experience on campus and support for the student-athlete academic experience. I set aside personal bias to study the issue from the perspective of the participants.

**Summary**

In Chapter III the researcher explained the methodology. In Chapter IV, the findings are presented and applied to existing research. A summary of the study, conclusions, implications for practice, and recommendations for further study are discussed in Chapter V.

# Chapter IV

## Findings and Analysis of Data

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. During in-depth interviews, study participants described their perceptions and experiences with academic use of mobile technology as student-athletes in such topics areas as: feelings about using the iPad; class use of mobile technology; and relevance of mobile technology in classwork. The research findings are based on analysis of structured interviews.

### Presentation of Findings

Data collection and analysis occurred simultaneously as interviews were conducted, transcribed, and uploaded into analysis software. To assist with data analysis, the information obtained from the semi-structured interviews was entered into the data software Excel. A total of twenty student-athletes were interviewed for this study, with each interviewing between fifteen and thirty-five minutes.

Student-athletes were interviewed in locations convenient to them, including the university's two tutoring sites, as well as classroom locations, before and after class sessions. Participants ranged in age from 18 to 22, and came from across the athletics landscape. There were eleven men and nine women. Two were freshmen, three were sophomores, three were juniors, seven were four-year seniors, two were fifth-year seniors and three were graduate students with remaining eligibility. Sports included football, men's and women's basketball, men's and women's track, women's swimming,

wrestling, men's soccer, field hockey, men's lacrosse, women's volleyball, men's ice hockey, rifle, spirit, and men's and women's golf. Of those interviewed, four had prior personal experiences with using an iPad before coming to the university, having received them as gifts from family members. None had been provided an iPad in prior class environments. In addition, two participants (1 and 4) had been in classes where the iPad was taught as part of the participant matter and two (14 and 15) received an hour of academic iPad training as part of his summer orientation.

Recordings were conducted using the app Cogi on the iPhone and Notability on the iPad. The recordings were transcribed by the online transcription service Rev and categorized in Excel to analyze frequencies found within the data. At that point, analytic codes and categories began to emerge from the collected data. These analytic codes were then compared to each other using a constant comparative analysis approach, a method for analyzing data in order to develop a grounded theory (Glaser, 1965). As the analytic codes and categories developed, the analytic process became more elaborate as connections and similarities in the research data were made. A conceptual relationship between three themes was discovered and a theory inductively emerged from this process.

Table 2
*Demographics of Participants*

| Subject | Age | Gender | Sport | Year | Major | iPad Experience |
|---|---|---|---|---|---|---|
| 1 | 21 | M | Track | 4 | Communication | No |
| 2 | 20 | F | Women's Lacrosse | 4 | Electrical Engineering | No |
| 3 | 20 | F | Rifle | 3 | Neuroscience | No |
| 4 | 21 | M | Men's Gymnastics | 5 | Journalism | No |
| 5 | 20 | M | Golf team | 2 | Finance | Yes |
| 6 | 20 | F | Women's volleyball | 3 | Communication | No |
| 7 | 18 | F | Swimming | 1 | Health Promotion/Nutrition Exercise Science | No |
| 8 | 22 | M | Spirit | 5 | Human Development | No |
| 9 | 20 | M | Spirit | 3 | Sport Industry | No |
| 10 | 21 | F | Field Hockey | 4 | Economics | No |
| 11 | 20 | M | Men's Soccer | 4 | Communication | No |
| 12 | 21 | F | Track | 4 | Sport Industry | No |
| 13 | 20 | F | Golf | 2 | Communication | No |
| 14 | 21 | M | Lacrosse | 3 | Sports Industry | No |
| 15 | 21 | M | Hockey | 1 | Business Finance | Yes |
| 16 | 21 | M | Wrestling | 4 | Communication | No |
| 17 | 22 | W | Women's basketball | 5 | Sociology | Yes |
| 18 | 22 | W | Women's basketball | 5 | Communication | Yes |
| 19 | 23 | M | Men's basketball | 5 | Sports Coaching | No |
| 20 | 22 | M | Football | 4 | Pharmacy | No |

**Overview of Perceptions**

Participants were initially asked their feelings about receiving the device as part of their recruitment to the university. All of the participants viewed it as a positive experience. Eight described it as "cool," three were "excited," and two mentioned it felt like "Christmas."

One participant noted the iPad made her feel “so special,” especially as a nervous, incoming freshman trying to figure out what it means to be a student-athlete. Two participants had laptops that were not meeting their academic needs, so they looked forward to trying the device for academic. Another noted she “grew up not the richest person,” so the iPad was significant to helping her feel she had technological access to begin her collegiate career. One participant admitted being excited, but it quickly wore off when she realized more comfort using a laptop, and saw no reason to adopt new technology. Another acknowledged that while he felt the iPad was “really cool,” he had no idea how to actually use it for academics. “I was like, now what?” he said. Another participant noted he was pleased to get an iPad “worth $700,” and immediately loaded games onto the device, but added, “I didn't know what we were going to use it for.”

Student-athletes surveyed had varying perceptions as to why university athletics provided them with iPad technology. Three felt the primary motivation was athletics. One participant called it “a nice tool for sports,” adding “this way I don't have to go to my practice facility and watch film.” One also believed that since “the football team wanted to use them for playbooks,” then all student-athletes were provided the same opportunity. Recruiting was mentioned by two student-athletes, while five identified academics as the primary catalyst.

The reasons for the devices included helping with studying, to make academics easier, to use the school’s apps, and because more course material exists exclusively online or involves an online component. The fact that the iPad is cheaper than some laptops was cited as another reason. Another said it would allow all student-athletes to “start from the same place,” technologically speaking, no matter what their background.

One student-athlete felt the university's motivations were more superficial, as in it wanted to be able to say in the media, "Oh, we give all our student-athletes iPads." Another participant felt that providing technology was a requirement for this university since, "This generation is a generation of technology." Student and university engagement with Apple products, and the university's financial partnerships with the tech company were also cited as motivating factors. "Most of us have Apple phones so, it's easier to just link everything together, because Apple has the user-friendly interface where...our phones will connect to the iPad, which connects to laptops and all that stuff," said one participant. Another had no idea why the university would go to such an expense.

**Study Findings**

Three themes emerged from the data. Each theme identified different perceptions and experiences student-athletes had regarding the academic use of mobile technology. The themes revolved around conceptualization of the academic use of the iPad, practical usage, and challenges. The themes were:

1. Student-athlete perceptions of and experiences with using the mobile device.
2. Opportunities student-athletes anticipate, perceive, or experience in using the device academically.
3. Barriers student-athletes anticipate, perceive, or experience in using the device academically.

While the themes are reported as being discrete, there is considerable overlap among them. Further, participants' responses to interview questions often addressed more than

one theme. In those cases, the interview data are described where they appear to fit most logically.

**Theme one: Participants' use of the mobile device.** The respondents fell within three viewpoints—those who viewed the mobile device as a positive contribution to their academic goals, those who felt it could be neutral, and those who saw it as negative. Participants who were most likely to engage with the iPad cited the weight of the device as compared to a laptop as a contributing factor. This included Participant 2, who felt losing five pounds in her backpack made a significant difference and prompted her to leave behind her laptop and carry the mobile device. Participant 3 said, "If it's something that I can do on the iPad, I'd rather pull out the little, tiny iPad and do it."

***Portability positives.*** Regarding perceptions related to what the participants liked best about mobile technology, the fact that it was smaller and lighter than a laptop was significant, and "accessible" resonated with six of the participants. "It's like bigger than a phone, but it's not so big that you can't hold it," said Participant 14. Another popular perception was the device as a mobile TV screen, which was mentioned by four of the respondents. "It's easy to go to Netflix or something—maybe too easy," added Participant 10. "Sometimes I open my iPad, starting to read and then I see Netflix. I'm like, 'Oh…maybe one episode." I think everyone does it."

That type of accessibility also contributed to engagement with the device for Participant 7, who brought the iPad when she went to practice so she could:

> get some homework done for an hour or so before I had to leave for work or something without having to go all the way home to use my computer there. It was easy just to have it and bring it with me wherever I would go.

Participant 1 cited the accessibility of using the device instead of carrying textbooks. Interestingly, that student did not use the iPad provided to him by athletics, but had instead received one in a class he was taking for the semester. Participant 11 felt the iPad was handy on sports-related trips, and he appreciated not having to "lug around a big, heavy laptop." He cited YouTube and Netflix as his most common usage of the device. Participant 5 saw the device as faster and easier to carry due to its weight, and the long-lasting battery means he prefers it to a laptop. Participant 6 thought the iPad would be easier to carry around and lighter than the laptop, so she used it more.

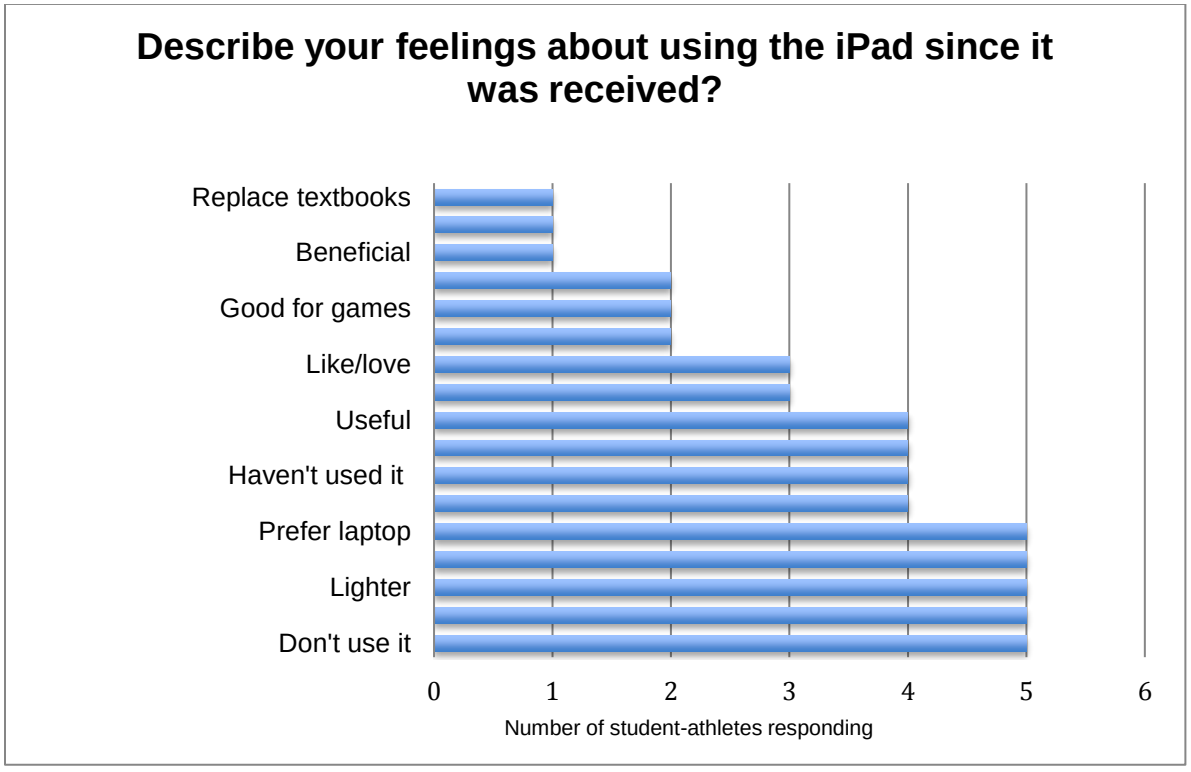


*Figure 1.* Describe feelings about using the iPad since it was received. This figure shows how student-athletes felt about the iPad after receiving it from the athletics department.

***Portability challenges***. Another perspective came from those who thought they would use the iPad more than they actually did. Participant 13 thought that since the iPad was lighter and easier to carry around she would use it probably more than her computer, but instead found herself using her laptop exclusively. She was hindered by the need for apps and explained, "All my stuff was originally on the laptop, and with the iPad, you have to download an app for everything. So sometimes that can be a little annoying having to do that." Participant 12 used the device in her freshman year, but "didn't find it that useful." When she saw no need for it in the classroom, she stopped using it altogether.

Similarly, Participant 15 used the iPad "a little bit at first," but called himself an "old-fashioned guy," who prefers to use pen and paper. He does, however, like the device for Netflix. Participant 16 used the device primarily for online games. He will also look at the school's learning management system app on occasion while he is sitting on his couch "and I don't want to break out my laptop." Participant 14 was told the device was for athletics, and he spends 90% of his time with the device watching game film, or laying in bed playing games on it. He believes his phone and laptop are more "academically based." Participant 17 took it to the first week of her classes, but it didn't work out well, because it was "too slow." She felt her fingers were "too fat" to use the virtual keyboard. "So then I just... put that away and I started using the laptop," she said.

***Pre-conceptions*.** Perceptions about the device swayed student-athletes both for and against its academic usage, even perceptions that were not based in actual experience. For example, Participant 3 preferred to take hand-written notes, and she "can't really do that on the iPad," although the device has handwriting capabilities. Other

perceived a mobile phone as more versatile and useful than an iPad, due to its ubiquitous nature. Participant 10 used her phone "a lot," even though she is "not a mobile technology person." Her usage included Facebook, Instagram, and WhatsApp, but she had not used any of the apps on her iPad. Participant 13 noted she used her phone for keeping a calendar, and she would like to use the iPad for that, too, since, "It would be easier to see, since it was a little bit bigger," but the phone is more convenient. Participants 14 and 15, similarly, received emails on their phones and used the calendar to input assignments. They also checked the learning management system on their phones, but not the iPad, because the phone is in their pockets consistently. "For proximity, I'd say my phone is my biggest academic tool," Participant 14 said. In terms of the best tools for class notes, eight respondents chose "handwriting notes." All perceived the only option to perform handwriting was paper and pen/pencil. Participants 2 and 14 did not feel that technology was especially relevant in their class experiences.

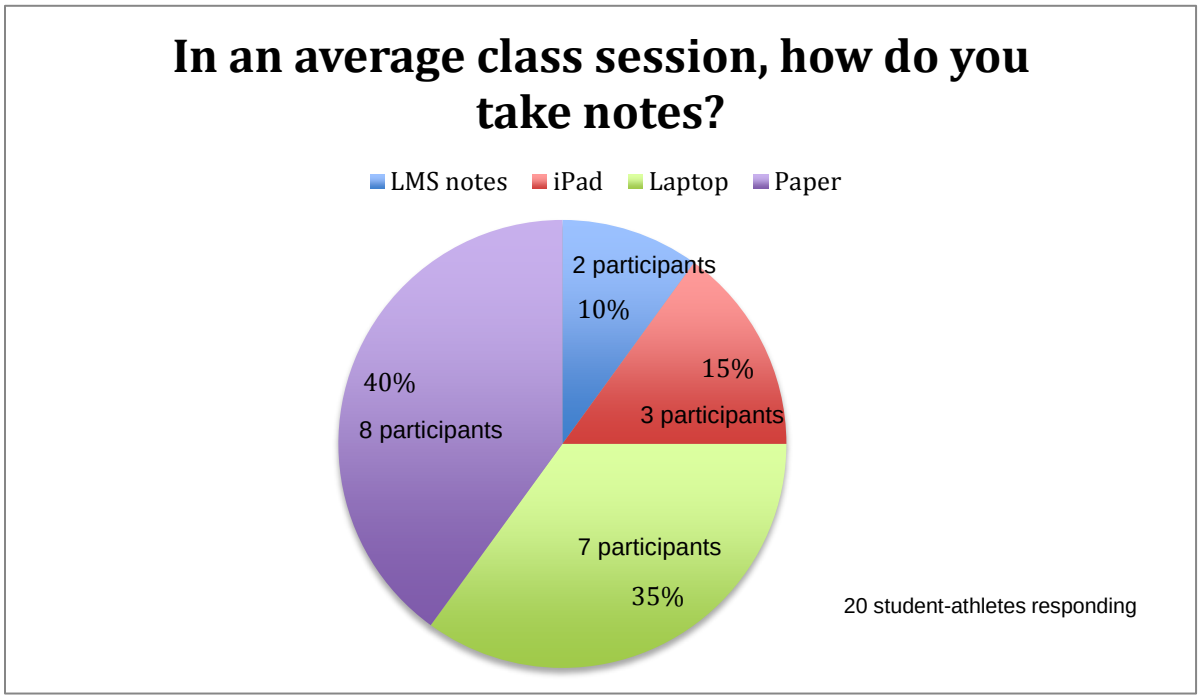


*Figure 2.* In an average class session, how do you take notes? This figure illustrates what tools student-athletes use to take notes in class.

***Class materials.*** When asked about accessing class materials, all respondents knew that the school had a learning management system with an app for mobile devices, but their perceptions of how to access that technology differed. Eight utilized desktop computers, citing greater comfort in using what is consistent and familiar to them. Even the five students who used the iPad to access Learning Management System may not use the app:

> I go through Safari to get to it instead of using the app, because when I first started using the app it was buggy. It would always tell me that I had a bunch of messages, even though I would go in, and it wouldn't let me see them, so it was just easier for me to go through [the web].

Participant 2 added, “I can get more done by laptop. It's nice to be able to pull up two things at once.” Participant 9 said, “I use the web interface because that’s how I access things. I don't know why I don't use the app.” Of the five participants who used the iPad, three of them had faculty members who integrated mobile technology and applications into the coursework. “My organic chemistry professor right now actually, all of our homework programs are through the Top Hat app,” said Participant 3. “So even though we're not necessarily doing the questions in class, you still have to have the app to do the homework questions,” continued Participant 3.

In summary, most student-athletes who were part of this grounded theory study saw merits in the mobile device for academics, and several had found ways to use it in some way in their class environment. The majority, however, saw the device as ancillary, at best, and instead relied on more familiar technology (phones, laptops and desktops) to fulfill academic responsibilities.

**Theme two: Benefits to using the device academically.** The opportunities for using the mobile device were evident to many of the participants, including Participant 4, who noted, “This generation is a generation of technology.” The participants identified numerous opportunities provided to them by using the mobile device in academics, much of it related to accessibility. Participant 7 identified personal organization skills developed with the device, including alarms, calendars, social media around meetings (GroupMe) and reminders. Participant 1 noted that he had replaced his hard-copy textbooks with digital versions, while Participant 4 cited the convenience of meeting with an advisor and being able to pull up assignments, class messages, grades, and textbooks on one device. He also cited the speed of using the device, stating, “Things I do on my

iPad will take me maybe 10, 15, even 20 minutes to do it on my slow computer." For Participant 7, the ability to have all class resources and materials with her all the time has made her a more efficient student. "It's a lot easier to sit down and actually study as opposed to, 'Oh, I forgot my textbook at the dorms, I guess I'll just sit here, hang out, do whatever,'" she recalled. Participant 7 explained:

> You have access to, if not an online textbook, access to online materials that you can access. And it's a lot more convenient than bringing textbook, spiral notebook for notes, another computer or something, it's a lot easier to just have it in the compact, and take it wherever you go and no need to rush around campus from class to class to dorm to pool to class to dorm.

***Traveling.*** The opportunity to use a mobile device while traveling for athletics is the most obvious most often cited (by six participants) use of the iPad for student-athletes. Participant 5 uses the iPad to bring up all classes during travel and has friends send class notes so he feels, "like I'm in class when I'm not there." Participant 4 mentioned:

> Being a student-athlete, we travel a lot. We're not allowed to have that much room for the things that we have to take for our sport. We can't really take our textbooks and our notebooks and paper. The iPad makes it so all that is in one place.

Participant 7 agreed that the need to "pack pretty light," especially winter sports, limits space, but with the iPad, "You can access everything that you need." Participant 5 acknowledged he used the device to connect with classes and classmates:

> I have friends that use Evernote in the class, and then they can send me their notes from that day on my iPad, which I think is great. That pretty much enables me to feel like I'm in class when I'm not there.

Participant 13 added that the mobile device is light and doesn't overheat. That means it can be taken it more places and utilized in smaller spaces, such as on a bus ride to competitions. “It's easier to lug around,” she said. Participant 15 noted he uses the device on the road to take part in discussion posts through the learning management application. Participant 7 noted that, overall, the device was especially helpful during the summer when she was still living at home. She would drive to practice and have the iPad with her to get homework done before leaving for work. “It was easy just to have it and bring it with me wherever I would go,” she noted. Participant 11 agreed it has “become really handy on trips” for doing homework. As an international student, he also appreciated use of the technology to connect with his family.

***Creative and organizational tool.*** Other participants found use of the iPad stimulated their creativity and provided organization in note taking, which helped their learning experiences. Participant 3 used the versatility of the iPad to color code class notes to help with organization. Participant 4 used the device to take photos of notes and videos of lectures. By keeping academic elements on one mobile device, he feels she is better able to focus. Participant 9 noted that since receiving the iPad he doesn’t do anything on paper anymore, and it has made him much more organized.

> My backpack gets packed, and I'm not organized at all. It's easier to be organized with one device with everything's in files. I can easily locate it. I'm not having to clean out my book bag at the end of the semester.

Participant 4 uses a note-taking app called Notability, which was suggested to him in an academic class. The app allows him to type, handwrite, color code, annotate pdfs, record audio of lectures and take photos of lecture slides. He called the app "life altering" adding, "Academically, it is keeping me on a really structured basis." Participant 4 expounded on his approach:

> I'm so organized with each class I'm in. As soon as I walk in, I pull up that file, start it, and it puts the date automatically. I just write the chapter's name, and I'm able to write simple outlines or record the audio of what the teacher's saying if I want to. It allows me to take a picture and add it to the notes if I want. I don't know how I would get through my classes without it.

***Applications.*** Participants who found the most opportunities for the device familiarized themselves with apps that made the device inherently more useful. Three participants had professors who utilized "Top Hat," an app for quizzing and attendance, so they used the iPad every day in those classes. As Participant 5 noted:

> Half of the classes I take, take attendance, using Top Hat, so, if you didn't have a device with you sometime, you wouldn't even be able to be called for attendance. It provides a great tool for us to take notes easily, have it on the go, wherever we need to be. You've got Google at your fingertips, so you are able to look up something at any time.

Introduction to using the device for Top Hat usage led Participant 3 to use her iPad even more. She detailed her note-taking process:

> I looked for a digital copy of my textbook, and I started using the iPad for notes sometimes. If you turn the right way, you can write on it, like with just your finger. I took really colorful notes from my Biology session.

Participant 7 noted that her professor provides quizzes through the learning management system, and she finds it easier to take them on the iPad. "It's just like tap, tap, tap, and I am done," she mentioned. Participant 7 continued her description with:

> If you're on the (LMS) webpage, you would have to click, load, click load. With the app it's already loaded up pretty well. You just go, all right, Sociology, module three, lecture slides and then you just go right into it.

Participant 8 recalled two professors in physiology and chemistry posted PDF versions of study materials with specific words left out, and cited the ease of populating the field with the iPad. "I opened it in Adobe Reader and then filled them in, and then saved them in my notes," he said. "It made me much more organized." Participants 5 and 12 use the app Evernote to take notes, and found it useful when they attend class and when they cannot. Participant 5 reported, "With Evernote…you can record classes, too." Participant 5 continued with the following example:

> We missed a midterm review once in an economic class I took last semester, and I had a buddy in the class literally record it. I was able to get the notes and the recording while on the road on my iPad.

Participant 5 added that Evernote on the iPad allowed him to create a file system that he uses for each class. "I puts the date on it, title of the chapter we're going through that day, and then just sketching a basic outline," he said. "It's pretty simple and it keeps everything in one space—and I always have all of my materials with me."

***Ancillary tool.*** While some participants did not use the device as their main academic tool, they did utilize the device as an ancillary tool to support their academic efforts. Three participants, including Participant 10, took notes on a paper notebook, but pulled up class slides or the syllabus concurrently on the iPad. Participant 8 mentioned, "It gives me the ability to have more resources open while I'm doing another task." Participant 8 added:

> If I pulled up (our LMS) and then a specific note section or lecture material that we had gone over in class or something while I'm doing a homework assignment. I'll have the iPad propped up and then I'll use it looking up whatever I need.

Overall, participants who personally sought out ways to use the device or were prompted to use it for a class experience used it more and more effectively. Those student-athletes trained in use of the iPad for classwork (Participants 1 an 4) mentioned it had a positive impact on their academic use of the device. As Participant 4 noted:

> Once I got the iPad--I'm not just saying this for the interview either--I actually do take a lot more notes because of it. And it's something I've become a lot more religious with. And it keeps me very updated and very organized with my notes. And I love it for that.

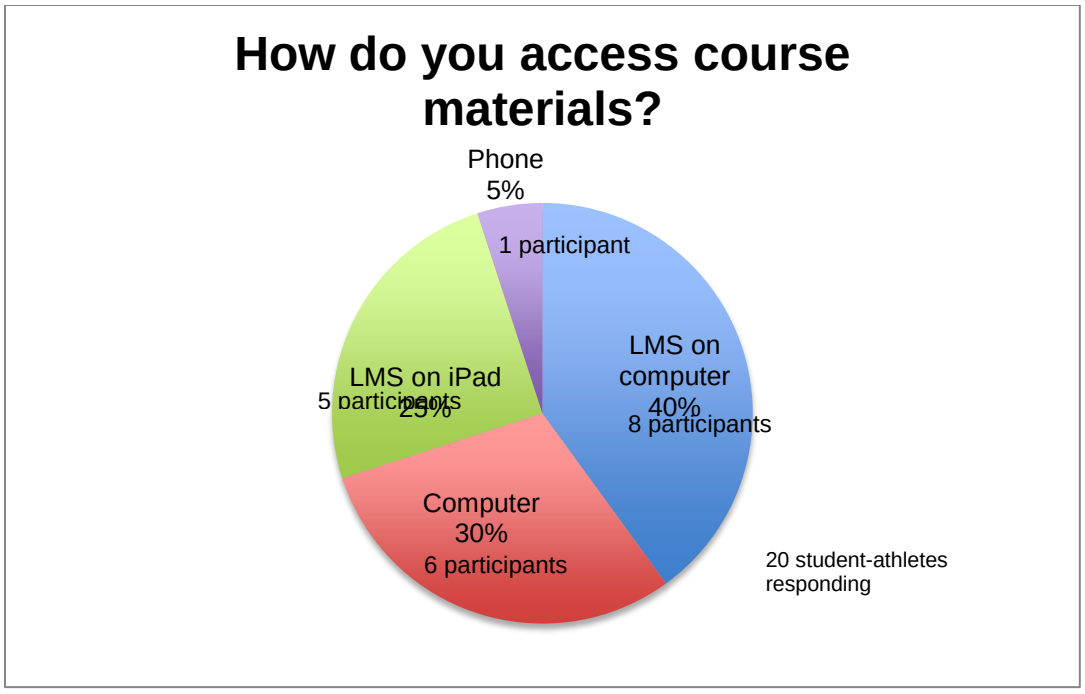


*Figure 3*: How do you access course materials? This figure illustrates which device student-athletes use to access course materials.

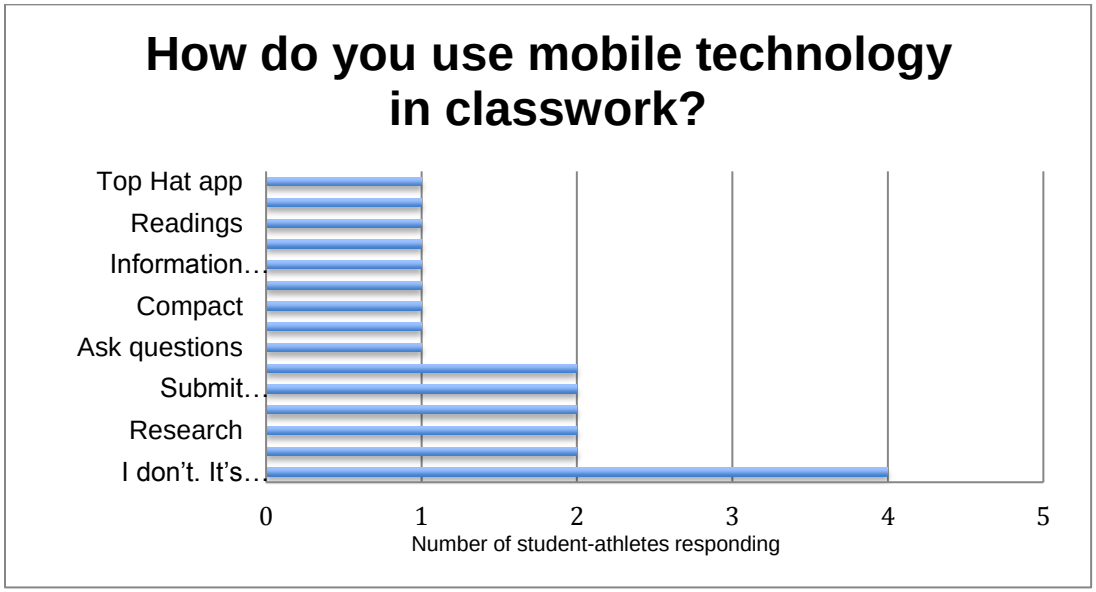


*Figure 4*. How do you use mobile technology in class work? This figure illustrates how student-athletes use their mobile technology in completing work in class.

**Theme Three: Anticipated academic barriers from student-athletes.** Of the participants studied, more than half of them had significant barriers—real or perceived—that kept them from using the iPad for academic purposes. This included six participants who used the device far less the longer they owned it. There were also participants who admitted they simply did not see or understand the academic uses for the device. There was also a lack of understanding or awareness about what applications were available on the device.

***Peripherals and applications.*** Participant 1 noted he "used the heck out of" the iPad in his freshman year, but then stopped using it. He noted:

> The computer was just easier, and I knew what to do. I really didn't know what to do with the iPad. And the Internet was distracting. I knew if I did bring it to class I would just be on the Internet or on YouTube or something.

Participant 12 admitted that after her freshman year she got "tired" of using the device. The iPad didn't have an external keyboard, and the virtual keyboard took up half of the visual screen field when in use. "I got tired of tapping the screen, and the keyboard took up too much of the screen," she stated.

The lack of peripherals, such as external keyboards or styluses, proved a significant barrier to academic usage of the iPad. This became a more significant issue for upper classmen, as keyboards were provided to freshman student-athletes in 2016 and 2017. Participant 3 said, "It would definitely make typing a lot easier. When I first heard about the keyboards, I was like, 'Wait a minute--I never had a keyboard." Without an external keyboard, Participant 10 admitted she never uses the iPad to write papers. Participant 6 recalled that freshmen on her team use an iPad more, because of the

keyboards, but teammates without keyboards rarely use them. Other student-athletes were unaware of developed apps that corresponded to the learning management system or apps that might help with academic related tasks, such as taking notes or recording lectures. “I have no app or anything to type notes on there, so I usually generally rely on my MacBook or handwritten,” a Participant 17. The device also lacked some technology that participants felt would be useful, including cellular data (Participant 3).

***Distraction.*** Distraction seemed to be a significant barrier for student-athletes engagement with mobile technology. Even though many of the tasks they cited could be a distraction on the laptop or phone, they felt the iPad made them more likely to access a distraction. “I don't typically use it in class, because I get distracted with games and such,” admitted Participant 16. Participant 10 noted that the ease of switching from academics to the Netflix makes her reluctant to use the iPad. “Sometimes I open my iPad, and I start to read, and then I see Netflix, and I'm like, ‘Oh, wait. Oh yeah, maybe one episode,’" she said. “I think everyone does it.” Most participants who expressed concern about distraction with technology felt it was far more of a potential challenge with the iPad. Participant 5 noted:

> It's also really easy to go back to home screen and click on Twitter and scroll through what's going on in the hockey world or whatever your deal is. That is, unfortunately, something I've fallen victim to once or twice.

Participant 2 recognized that the “distraction piece” was a key issue for her. She intentionally puts her phone and iPad away to pay attention to what the teacher's saying. She cannot see opening an iPad without being distracted. “I can get more done on by laptop,” she stated.

***Multitasking.*** The perception that multitasking is more difficult (or even impossible) on the iPad, was also a significant barrier for participants. “I can't do the same thing on the iPad as I can on a laptop, in terms of organizing notes or taking notes,” said Participant 16. Participant 13 noted, “I can’t do two things at once, like look at a website and play a video.” She added that she felt it was too much work to download numerous apps as needs arise. Participant 13 described her frustration with multitasking and using apps:

> With the laptop, you don't have to download all those apps and stuff all the time. Sometimes it gets annoying. One time I was on [our LMS], and then I was going to write something, so I clicked to write and it said I had to download an app. And then you got to go and do something and then you got to download another app to be able to email it to somebody.

There were also apps that simply did not work as well on the iPad as they did on laptops or desktops. “Our team has a Google calendar…and I can't add new team members to it from the app,” Participant 3 said. “I have to pull out my laptop to do that.”

***Note taking.*** Handwriting notes is a common classroom practice for the participants, and many of them felt it was not feasible to accomplish on the iPad. If it was feasible, they just did not like it as much as a notebook. “I'm more of a handwritten person,” said Participant 2, with Participant 3 adding, “I don’t use the iPad because I definitely prefer to take handwritten notes.” Participant 13 recalled seeing people with “little tablets they can write in,” and she wished the iPad could do the same. “I know I would probably use the iPad more, if I could write it into the screen,” she said. Other students preferred the tactile feeling of pen and paper, and would prefer to avoid

technology for note taking. “Just having that physical paper--I just trust it more than technology,” said Participant 15. “You can lose it on technology. With paper, I know where that's going to be like all the time. I kind of like that physical element to it.”

***Device capabilities.*** A lack of awareness about the capabilities of the device also proved a challenge for participants. Participant 7 noted it was difficult to “transport files” since the iPad does not have USB port for a flash drive. “I think getting it from a different type of computer to the iPad could be valuable,” she said. Participant 7 explained frustration with storing files:

> I know there are ways you could put it in Google Drive or something and then get it off with the other computer, but I feel like it would just be more simple to just go directly from the other one. But I don't really know how that would work.

Participant 8 wished there was a way to record lectures while taking notes with it. Participant 20 believed the device was not useful for academics because, “You can't necessarily type a paper in Word and submit it like you can on a Mac or a HP laptop or something.” He noted that to get Word on an iPad, a user would have to “jailbreak” the device, and if you attempted to submit papers from the iPad to the learning management system, “the format will be messed up and it would just look weird.” Participant 18 believed that once something was downloaded on the iPad it could not be removed, so she was reluctant to download applications.

***Classroom use.*** Participants also saw little reason to use the iPad if faculty did not use classroom technology, or they had coaching staffs that were unfamiliar with technology. Participant 10 never downloaded the LMS app, because her teachers don’t use it and she saw little need to use the iPad. Participant 2 believed coaches did not know

how to use technology at all, so they did not encourage use of the device. “They're not really tech savvy,” she said. Participant 17 has faculty who are staunchly opposed to technology, and refuse to let any technology be used to chronicle or access class materials. She sees little reason to utilize technology personally for academics if her professors do not.

***Training.*** Another challenge identified by participants was the lack of meaningful training. Only three participants had any formal instruction in apps and features for using the iPad in class environments. Participant 4 described personal experiences:

> I learned [in a class] how to use a notes app [Notability] and how to use the keyboard with it. Before that I didn’t even know how to connect the keyboard to the iPad. When we first got the iPads, they just gave it to us and taught us how to turn it on and set up Apple ID. It was very basic.

Participant 8 detailed his experiences and perceptions of training provided by university athletics:

> I was told not to anything stupid with it, and to care for it as one of your possessions, and if you don't graduate you don't keep it. I'm really old, so I am hoping they got better with showing people how to use it now.

Participant 9 received a “10-minute run-through” on how to turn on the iPad, location of the charging port, and how to sign in to the Apple app store. “I think they figured we already knew how to use it,” she said. Participant 3 discovered all of the “nifty little things” by herself. “I discovered the iBook app by accident, and I don't think anybody told me specifically, at least from the athletics department, that our [LMS] was going to

have an app." Participant 13 noted that even the apps she was told to download received no instruction.

> I don't even know how to use the apps they told us to download. They are just sitting there. I wish that they taught us what the apps were for, and how we could use them with our school work.

Participant 5 felt the biggest thing university athletics could add is a learning seminar to go through to learn how the iPad could best be used academically.

***Out-of-date technology.*** A significant issue for some students was out-of-date technology. Some student-athletes (upperclassmen and transfer students) had older devices—including three that were first-generation iPad models. These devices did not come with cameras. Participant 18 noted technology kept changing, but the iPad was so basic as to be completely out-of-date:

> With technology, it's something new that's always being added and you can use it, but the iPads that we have are literally like the basic ones, so there's nothing really. And there's not a lot of storage too…. With the new iPads, you can type papers from Microsoft Word, you can save it to Pages. But you can't do that on the iPad that we have--you just can't do it.

Five participants (7, 16, 17, 18, and 20) received an iPad from athletic technology services, but were not provided a charger. As a result, the student-athletes used their phone chargers to charge the iPad, which resulted in extremely slow charging times of 3.5 hours for full charge with iPad charger versus 5 hours for iPhone charger (Gandionco, 2017). Participant 18 received a keyboard, but did not receive a charger for that either. When the keyboard battery died, she stopped using the iPad. Participants 17 and 18 were

disinclined to use the device, because they believed that athletics would then have access to their personal correspondence and materials. Participant 17 explained:

> My teammates were talking and they said…athletics checks everything that you do on iPad. That threw me off. I'm like, 'I'm definitely not doing anything on that.' Not that I do anything I don't do anything crazy on there, but that's just like, I don't want you to see my pictures, I don't want you to go through notes, email.

In summary, student-athletes were hindered in their use of the iPad by perceptions that were both accurate and inaccurate. Many of them were not aware of ways to use the device for their academics. They also did not feel supported either by classroom faculty. Student-athletes also felt that a lack of guidance and instruction hindered their understanding of how the iPad might be used academically.

Table 3
*Research themes*

| Theme 1 | Theme 2 | Theme 3 |
|---|---|---|
| Student-athlete perceptions of and experiences with using the mobile device. | Benefits student-athletes perceive or experience in using the device academically. | Barriers student-athletes anticipate, perceive or experience in using the device academically. |

**Overview of Themes**

Three themes emerged from the data. The first theme related to how the participants perceived their mobile device through perception or experience. The second theme examined what opportunities the participants' anticipated, perceived, or experienced in using the device for academic purposes. The final theme identified the

barriers the participants anticipated, perceived or actually experienced in using the iPad for academic purposes. Each of these themes was abundant in the research data. Appendix B provides a visual representation of the topics addressed under these themes. In each theme, the student-athletes provided explanations, examples, and insights into their perceptions of using the iPad for academic purposes. In addition, follow-up questions saturated each theme with data, providing additional explanations and insight into the themes.

**Comparing Themes with Existing Literature**

The existing literature regarding student-athletes and mobile technology use for academics was divided into five major categories during the literature review. The categories were learning needs of the student-athlete, digital native theory, limitations to digital native generalization, actual mobile technology use, and digital opportunities. These current literature categories were compared to the three themes found in the research study. The research results support findings in current literature and fill a gap in current literature by more fully describing how student-athletes experience and perceive mobile technology.

**Learning needs of the student-athlete.** The literature showed that student-athletes have a unique culture and experiences that separate them from their more conventional peers, and that was evidenced in the research conducted. The participants addressed the challenges they face of traveling and accomplishing school-related work amid their practice and game schedule. Comeaux (2015) advocated universities provide academic support that takes into account the challenges of an athletic schedule, as well as support for athletic focus, and support for career development. The student-athletes

acknowledged that the technology provided by the university was significant to them, especially due to their travel schedule. As Subject 4 noted:

> Being a student-athlete, we travel a lot. And so, like at airports, we can't take our textbooks and our notebooks and paper. We're not allowed to have that much room for the things that we have to take for our sport.

Participant 7 felt the iPad was just one of "a multitude" of tools the university gave student-athletes to help with their unique academic challenges. Comeaux (2015) also noted student-athletes are isolated from the general student body, particularly in season, which make it all the more important to provide external academic support. Participant 5 believed the iPad enables her to stay connected to her classmates and class activities, especially since she misses so much time due to her athletic schedule.

**Digital Native Theory and its limitations.** In exploring the digital native theory, literature indicated that so-called digital natives may not be as proficient in the use of technology as expected (Thompson, 2013, 2015). That was clearly supported in this study by student-athletes who admitted they simply did not know what they did not know when it came to using mobile technology for academics. For example, Participant 5 said several teammates who received an iPad expressed, "I don't know what I can do with this thing." Participant 5 also advocated the athletic department offer seminars to individual teams, and to the athletic body as a whole, to discuss how the mobile devices could be used for academic purposes. Those purposes include "great note taking with your iPad, using an app, whatever it may be." Participant 7 felt student-athletes are not using the iPad as much as the administration may have hoped, because "they don't know how or their program does not use it."

Some participants said they would have found it useful to learn about apps that were academically useful, as opposed to the apps currently provided by the university on the iPad. Participant 19 admitted he is not very "tech savvy," so figuring out use of the device on his own was not a priority. Participant 8 was able to find applications, but was surprised that the university did not provide guidance in using the iPad for classwork.

> They didn't have anything that allowed you to assist your studies. There wasn't anything to help take notes. I ended up going out of my way to find note-taking apps and things to help me edit PDF and stuff like that that my teachers were then offering to download.

Participant 13 wished the university athletics department would teach student-athletes more about using the iPad academically, because, "I know there are probably things you could do on it that I don't even think of, that I'd probably utilize if I knew that they were there." She cited examples like apps for specific majors or classes, or overall student responsibilities like textbook readings, writing, and research.

Three student-athletes felt comfortable with the devices, and felt they could figure out how to do something if it was needed or required. However, those same participants (3, 9, 16) were unaware of basic functionality of the iPad, such as its accessibility features, and that note-taking and writing apps were available. Student-athletes interviewed also expressed desires for the device to have attributes they felt were lacking, including: ability to split screen (2), allow speech to text (1), transfer files between computers (2), record lectures while taking notes (1), and submit assignments to the LMS (1). The device can actually do all of these things either inherently or through a third-party app.

**Digital opportunities.** The idea of personalized learning, modeled after the ‘‘Personal Learner’’ in Beer’s Viable System Model (Johnson & Liber, 2008), demonstrates how technology, used well, can let learners create and manage their own learning, to maximize their experiences and productivity. Citing a United Kingdom example, researchers argued that technology allows for a focus shift where learners have more power over learning engagement (Johnson & Liber, 2008). Personalized learning allows educators to meet the varying backgrounds related to technology, infrastructure and past learning experiences (Su et al., 2011).

The iPad is useful for note taking, highlighting texts, or taking pictures, but many student-athletes still considered mobile devices to be more for entertainment than education (Gong & Wallace, 2012). This was clear by the number of student-athletes in the study (13) who mentioned Netflix as a key use for the device. Participant 13 described her iPad as “just something to watch Netflix on that was smaller than my computer, that didn't get hot on the bottom.” Participant 12 said that since his coach doesn't use the iPad and most teachers don't, he stopped trying to use it academically and “now I just use it for Netflix.” An additional five student-athletes primarily played games on the device. When asked what he wished the university knew about his perception and use of the iPad, Subject 16 responded, “I don't want them to know how much we use it for games, because they might take them away.”

Although the research showed longer battery life and ability to incorporate handwriting and typing made the iPad far more useful than a laptop (Mang & Wardley, 2012), this research did not show that to be an accurate perception among student-athletes as users. Only three participants preferred the iPad for class notes, while seven used a

laptop and eight preferred handwritten notes using pen and paper. Two used computers to take notes via the learning management system. In addition, 14 student-athletes interviewed, accessed their learning management system primarily through a laptop, while only five felt the iPad was the primary tool. One participant used the phone.

**Mobile technology use.** A study by Park et al. (2007) confirmed that perceptions about the ease of technology use significantly impacted whether or not people would consider it useful. This also follows the Technology Acceptance Model (Davis, 1989), which proposed that subjects presented with a new technology have specific factors that influence decisions about how and when they will use it, including perceived usefulness and perceived ease of use. Based on this theory, if student-athletes do not clearly see the usefulness of the iPad, or they do not perceive it will be easy to use, then it is likely they will decline to use the technology in favor of something else that fits both perceptions (Davis, 1989).

For users to adopt electronic courseware, they should possess a strong desire to use that technology (Davis, 1989). In the case of this study, the student-athletes who felt supported in using mobile technological for academics were much more likely to use it. Of the student-athletes interviewed, only four had any training in how to use the device academically—one in a semester-long class and the other in an hour-long training session. The remaining 16 all had the same instruction when the device was disseminated:

1. How to turn it on.
2. Where the charger went.
3. How to input Apple ID and link to the app store.

4. Not to break it.

In addition, four participants were shown how to connect their university email.

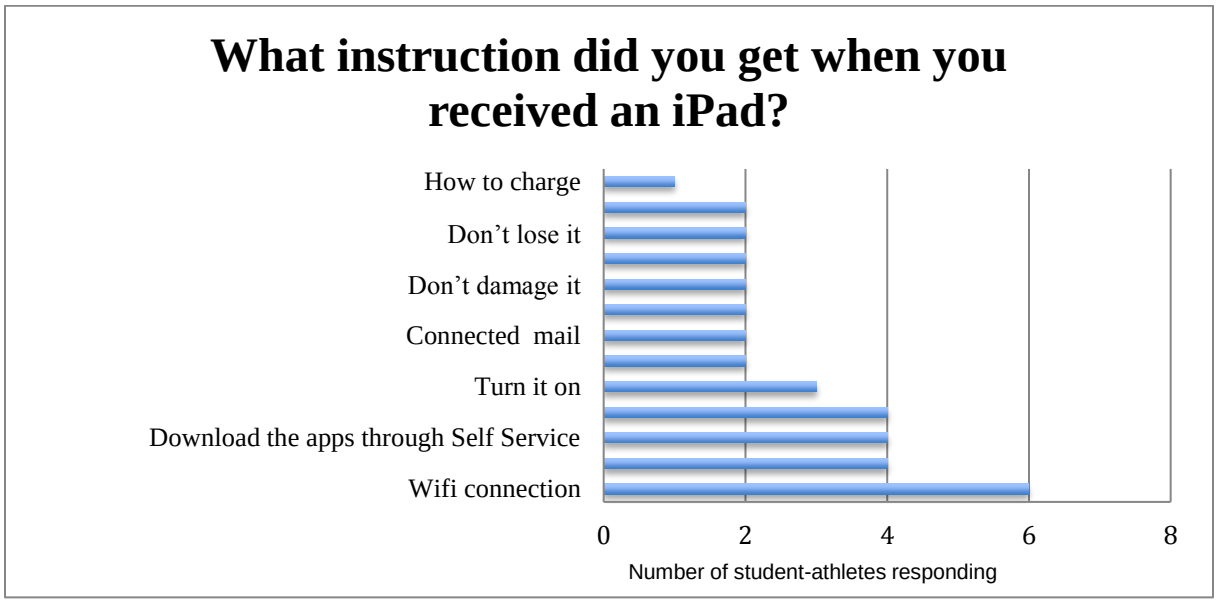


*Figure 5.* What instruction did you get when you received an iPad? This figure illustrates what training student-athletes received when they were provided the iPad.

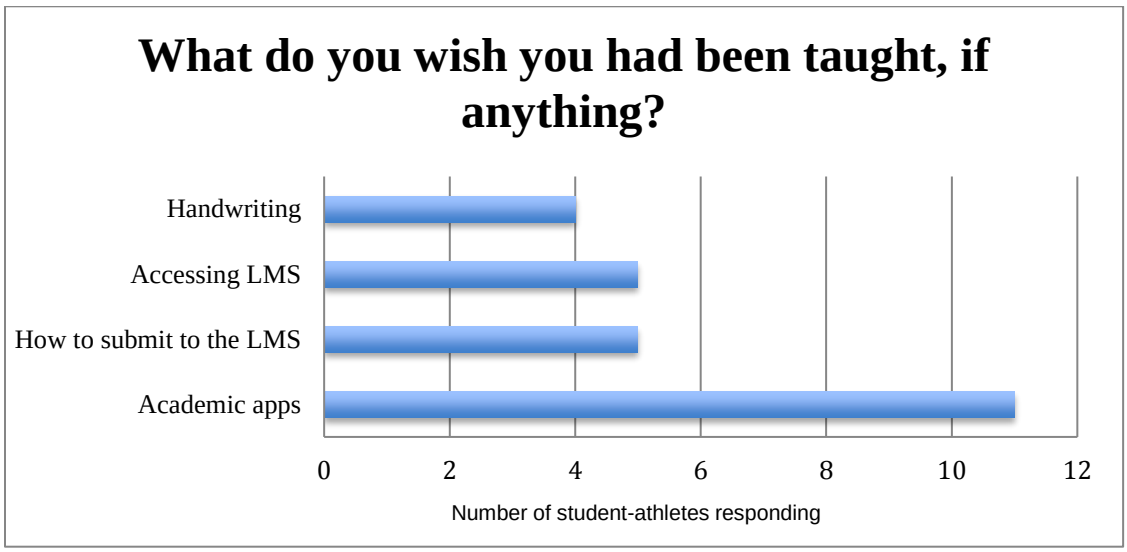


*Figure 6.* What do you wish you had been taught (summary)? This figure shows what student athletes wish they had been taught about using a mobile device in the classroom.

This indicated that the idea of the digital native was a fallacy. Student-athletes consider themselves competent users of mobile technology equipment and software applications, although they often show little evidence to suggest digital technologies enhanced learning (Aldhafeeri & Male, 2015). This population illustrated there may actually be a point of saturation in that student's use of contemporary digital tools for personal benefit. That saturation keeps them from expecting to use those tools for educational purposes as well

Responses from student-athletes seemed to confirm that college students have an interest in using mobile technology for school work (Pearson, 2015), but that interest is not sustained without faculty and institutional support. Technical competencies that are assumed about digital natives are actually not evident in this population when it comes to student use of technology in any meaningful academic way (Bennett & Maton, 2010).

According to a study by Tossell et al., (2014), even those students who have access to mobile technology do not necessarily want to use it for academic use, and this population was a clear representation of that. The study (Tossell et al., 2014) also saw mobile devices as detrimental to learning outcomes, because they were a distraction, and that was clearly indicated by participants in this study. Researchers assumed and expected that students given a tool would know how to use it, but the study and this research showed that without guidance devices had the potential to get in the way of learning (Tossell et al., 2014).

**Summary**

Chapter IV disclosed the sample selection process that was used for the research study, the interview process, and the data analysis that was conducted. The demographic information was reviewed in detail, including tables, to assist the reader in gaining an understanding of the characteristics of the research population. Three themes emerged from the research data. Chapter V addresses this data and information from Chapter IV and applies it to the original framework of the study, and the future directions of the research.

# Chapter V

## Summary, Conclusions, Implications, and Recommendations

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. This chapter contains a summary of the study, the summary of major findings and conclusions, implications for practice, recommendations for future research, and concluding remarks.

### Statement of the Problem

Students-athletes have been given access to technology in their class experience. What they have not been taught is how to think of technology, especially mobile technology, as an organic educational tool (Calvani et al., 2012). The research problem looked to develop a theory about how student athletes at a large Division I Midwestern university develop an understanding about using mobile technology for academic purposes. Just because student-athletes have technology and are comfortable with it does not mean they use it as confidently for academics as they do for social and personal interactions. (Sánchez et al., 2010).

### Purpose Statement and Research question

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. The following open-ended research question guided this study:

RQ1. What theory emerged from the data to describe how student athletes at a large Division I Midwestern university develop an understanding about using mobile technology for academic purposes?

**Review of the Study Design**

A grounded theory study was used to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. Voluntary sampling was used to select study participants from student-athletes who received an iPad from the university. An email was sent to all student-athletes seeking volunteers. Those who volunteered were stratified into team sports to select a representative sample from as many teams and genders as possible (Creswell, 2013). All participants in this study met the following selection criteria: (a) a student-athlete enrolled full-time at the university, (b) age 18 or older, (c) in possession of a university-provided iPad, (d) selected on a voluntary basis, (e) who have had access to the iPad for at least one full semester. Any individual who did not meet the criteria was not a part of the study sample.

Data was collected through individual face-to-face interviews to identify perceptions of participant experiences (Charmaz, 2006; Creswell, 2013). Collection of data involved individual, recorded interviews where the student-athletes were asked fifteen open-ended questions (Appendix A) to explore their use of the academic tools and what they considered while utilizing them. Interviews took place in tutoring areas. Initial data collection was used to generate categories, which was refined and verified through subsequent collection. As per the guideline of grounded theory research, data were

collected and analyzed simultaneous and continuously throughout the study (Urquhart et al., 2009). All participants were informed about how data were used, how codes were used to protect confidentiality and anonymity, and how the data would be stored for five years.

Twenty individual face-to-face interviews were scheduled and conducted at times convenient for each participant. The researcher was the only interviewer. An iPhone and iPad were used to record the interviews, and an iPad was used to write handwritten observations and follow-up questions during the interview. Participants were advised that participation in the study was strictly voluntary and confidential. The interviews were transcribed for content analysis.

The participants responded to fifteen primary open-ended interview questions, that were augmented by prompts and follow-up questions to obtain rich descriptive data (Rubin & Rubin, 2005). The question categories aligned with the study's research question and included student-athlete perceptions about academic use of mobile technology, self-efficacy in using mobile technology for academics, and student achievement using mobile technology for academics. The individual face-to-face interviews were conducted in a private area to maintain confidentiality and comfort.

**Summary of Major Findings**

Three themes emerged from the research data, collected through protocol questions. Each theme identified different perceptions and experiences student-athletes had regarding academic use of mobile technology. The themes were:

- Theme one: Participants' perceptions of and experiences with using the mobile device;

- Theme two: Benefits student-athletes perceive or experience in using the device academically; and
- Theme three: Barriers student-athletes anticipate, perceive, or experience in using the device academically.

**Theme one.** Theme one indicated participants' perceptions of and experiences with using the mobile device. In this theme, the researcher identified how exactly student-athletes conceived of mobile technology for academics. These five key points were the most significant findings:

- The size and weight of the device initially compelled made student-athletes to use the mobile device, and they saw its convenience due to its parameters.
- "Accessibility" and "convenience" were terms used to describe the mobile device for academics.
- Several participants believed there were ways to use the mobile device in their class environment.
- Other participants thought they would use the mobile device more, but never found a meaningful use for it in their academic environment.
- The majority saw the device as ancillary, at best, and instead relied on more familiar technology (phones, laptops, and desktops) to fulfill academic responsibilities.

**Theme two.** Theme two explored benefits student-athletes perceive or experience in using the device academically. In this theme, the researcher identified what benefits student-athletes saw in the use of mobile technology for academics. These five key points were the most significant findings:

- Several participants viewed themselves as a generation of technology who are familiar with how technology can be used in all circumstances.
- Student-athletes who personally sought out ways to use the device or were prompted to use it for a class experience used it more, and more effectively.
- The opportunity to use a mobile device while traveling for athletics was the most often cited.
- Knowledge of academically useful apps made the device far more useful for student-athletes.
- Professor engagement or guidance in use of the mobile device greatly enhanced student-athlete engagement with the device.

**Theme three.** Theme three focused on the barriers student-athletes anticipate, perceive or experience in using the device academically. In this theme, the research identified what barriers student-athletes conceived of mobile technology for academics. These eight key points were the most significant findings:

- Student-athletes were hindered in their use of the iPad by perceptions that were both accurate and inaccurate, including the lack of handwriting and split-screen opportunities.

- Many student-athletes were not aware of ways to use the device for their academics.
- Participants did not feel supported by most classroom faculty.
- If academic use of the mobile device was not encouraged by major or individual learning environments/opportunities, most student-athletes did not use the device for academics.
- Student-athletes also felt that a lack of guidance and instruction hindered their understanding of how the iPad might be used academically.
- Failure to provide peripherals for the device—a keyboard, stylus, power source—significantly impacted use of the device over time.
- Participants viewed the iPad as a potential or actual distraction from academics, using it instead for social media or entertainment viewing.
- Student-athletes advocated for meaningful training on how to use the device for academics as opposed to assuming they knew how to use it.

**Conclusions**

The population of student-athletes can be generalized as being high achievers who struggle to conjoin their athletic and academic lives, and seek ways to maximize their time and locations (Burns, Jasinski, Dunn, & Fletcher, 2013). To that end, the iPad provided to athletics was seen by most as a constructive tool to accomplish these goals. The size of the device, its accessibility, ease of transport during travel, and the type of academic tasks it could handle, as well as the excitement of getting a new and innovative piece of technology made most student-athletes surveyed happy to receive the iPad. Nearly all believed they would like the iPad as an academic tool and believed, when they

first received it, that the device would be useful to them academically. Of the comments offered to describe first thoughts on the iPad, only two were negative. The rest felt it was "cool," a "great tool," and "like Christmas," while three were "excited," three were "surprised" and two felt "grateful." They described their feelings toward the iPad when they received it as "beneficial," "convenient," "handy," "easy," and "useful." Some found it increased their organization, and the more then knew and understood academically focused applications, the more likely they were to use the device academically. Their feelings about the device, for the most part, were reflected in the positive, utilizing words like "handy," "convenient," "helpful," "easy," "more accessible," "useful," and they "like it."

That perception of usefulness, however, quickly diminished for many, as they failed to find academically beneficial applications for the iPad (Davis, 1989). When asked how they used mobile technology, only eight mentioned academic uses, and they were restricted to relatively simplistic approaches: email, Google research, online notes, LMS integration and use of a classroom polling app. The reasons given for that diminished use varied, but the underlying theme was that there was disconnection between what university athletics believed the student-athletes knew about using technology academically and what the student-athletes actually knew (Comeaux & Harrison, 2011). The participants acknowledged they did not have a clear understanding of how the iPad could be used academically.

The lack of engagement with the devices within academic environments (professors, tutors, class experiences) hindered the student-athletes' ability to see the device in academic ways that transcend tasks they already do with mobile technology.

This is specifically referenced as a requirement in the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), which outlined that students are influenced by such contributing factors as the belief that the technology comes with sufficient structural support (facilitating conditions), the perceived pleasure that comes from using the technology (hedonic motivation), if it feels like it is worth the money (price value), and how familiar students are when they start with the technology (experience). Participants in this study did engage with the iPad, but more hedonistically-- checking email, listening to music, playing games, and entertainment like Netflix and YouTube. Most student-athletes received no instruction on how to use the iPad beyond turning it on, establishing Wi-Fi connection, linking an Apple ID, downloading ten pre-selected apps through a portal, and logging into iCloud.

Student-athletes indicated that any level of challenge or obstacle with technological use prompted them to stop using the device, whether the challenges were real or perceived (Atiquil, 2014). For some, a lack of institutional support, such as providing a power cord or keyboard, was an impenetrable block. For others, it was the challenge of academic work that seemed to push the iPad further into the background of their academic use. This also followed the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), which outlined three expectancies to determine the likelihood of technology use: (a) the perception that a device will improve job performance (Performance), (b) how easy the device is perceived to use (Effort), (c) belief adopting the new technology is important (Social) (Venkatesh et al., 2003). Student-athletes did not believe the device to be easy to use and felt other, more familiar tools better improved their performance. It may also be a direct reflection of the time

constraints on student-athletes, who do not have time to figure out how to use technology in a meaningful way (Retig & Hu, 2016). With their tight schedules and high expectations, many seemed inclined to stick with learning tools they knew and felt comfortable with, as opposed to exploring new academic tools.

Responses also followed Davis' Technology Acceptance Model (1989), which proposed that subjects presented with a new technology have specific factors that influence decisions about how and when they will use it, including perceived usefulness and perceived ease of use. Based on this theory, if student-athletes do not clearly see the usefulness of the iPad, or they do not perceive it will be easy to use, then it is likely they will decline to use the technology in favor of something else that fits both perceptions (Davis, 1989).

Student-athletes further expressed a desire to be taught how to utilize the iPad in their learning experiences. Those who received training either in their classes or through an athletics program said they felt more comfortable using the devices once they were show apps and device features that would benefit their academic pursuits (Park, Nam, & Cha, 2011). Others expressed that they would be more inclined to use the device for academics if they knew how to do so meaningfully. "I wish they would teach us more things that we might know that could really help us when it comes to using it," said one student-athlete. Another noted, "Knowing the basics isn't necessarily enough to use it for educational purposes." This follows the theory advanced in Technological Pedagogical Content Knowledge Standards, which outlined how content and pedagogy can be merged to create a better understanding of a subject and enable the transmission of that understanding to students in a transformative way through teaching (Shulman, 1987).

Student-athletes believed the university should set up training to show them how to use the iPad beyond their cursory understanding. In total, of the responses to the question, "What do you wish you had been taught," eleven participants sought academic apps, five wanted to know how to access or submit assignments to the learning management system, and five said how to handwrite using the iPad. Others saw little reason to have the device, or felt their limited comfort and familiarity with the technology made them feel the device was more effort than it was worth. "We need seminars on how to use it for classes," a participant said.

Participants advocated looking at academic technology as any new subject with which they were unfamiliar; it should be incorporated into a learning curriculum and utilize an educational framework. This follows the Unified Theory of Acceptance and Use of Technology, which outlined that students are influenced by such contributing factors as the belief that the technology comes with sufficient structural support (facilitating conditions), the perceived pleasure that comes from using the technology (hedonic motivation), if it feels like it is worth the money (price value), and how familiar students are when they start with the technology (experience) (Venkatesh et al., 2003; Venkatesh et al., 2012)

**What do you wish you had been taught about using the iPad?**

- It would be neat if they provided some kind of seminar for athletes to go to, that [taught], "Hey, this is a great tool to boost your note taking. This is a great tool to search article databases."
- If I can get Word on an iPad.
- How to submit papers into the LMS.
- Finding the things that could be useful with it.
- Apps that helped take notes.
- How you could use it as a school resource
- What we got was fine.
- If they can have something where you can save documents onto a certain app, and take documents and submit them for assignments on Carmen. That'd be helpful for sure.
- Maybe just kind of shown what some of those apps do. That would have been helpful, cause I know that's a lot of the reason why they give them to us.
- I wish they could have showed us…certain apps that could help with school and how to set up everything more thoroughly maybe.
- Nothing.
- Specific apps.
- You're just really not going to know how to work an iPad, beyond the basics. And knowing the basics isn't necessarily enough to use it for educational purposes. Because, if no one ever told you that there are apps that you can use, For your class notes, you're just going to use the basic note that the app will provide, so but it doesn't make using the iPad that much more special.
- How to use a flash drive or something to transfer files.
- I know what I need. As long as I can access Carmen, I'm good. I'm happy. I'm content. I don't use it for anything else but Carmen and Safari
- How to download apps on it and use it in our classes.
- I wish I could write on it like a Surface.
- I wish they would have said, "We're going to show you this is how we think you should use it."
- By having someone come in and maybe teach you in a more professional way, how to use an iPad for a specific class for school, I think it was there to help students realize how much of a tool it is in classes.
- Maybe there's more graphic design stuff you can do on it.
- I don't think anybody told me specifically at least from the athletics department that campus was going to have an app.
- I really wish someone would have told me how to use it in class. I mostly have on there just the things that came on it already, because I don't know how to use anything else.

*Figure 7.* What do you wish you had been taught, if anything, about using the iPad (expanded)? This figure illustrates what student-athletes wish they had been taught about using the iPad for academics.

**Theory of Dependent Learning for Academic Use of Mobile Technology**

This grounded theory study posed the research question, "What theory emerged from the data to describe how student athletes at a large Division I Midwestern university develop an understanding about using mobile technology for academic purposes?" Analysis of the responses from study participants revealed a theory entitled, "The theory of dependent learning for academic use of mobile technology." This theory describes how student-athletes are dependent upon formalized instruction in the academic use of mobile technology to stimulate classroom usage of that technology. It is derived from the three themes that emerged from the data. Those themes were converged together to describe how student-athletes perceive and experience mobile technology use for academics.

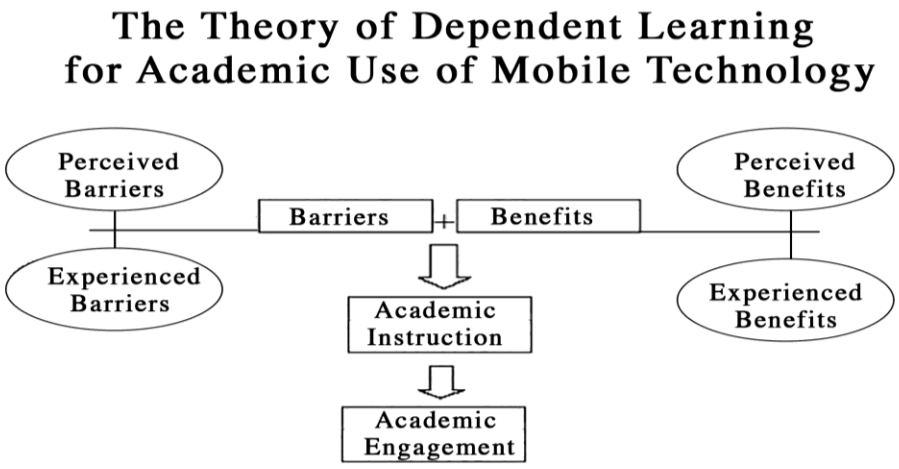


*Figure 8:* The Theory of Dependent Learning for Academic Use of Mobile Technology. This figure shows the how barriers and benefits (real and perceived) by student-athletes using mobile technology for academics can be shaped by academic instruction.

The themes looked at overall perceptions, perceived and experienced benefits, and perceived and experienced barriers. It became clear when examining the responses that student-athletes recognize they do not know what they do not know when it comes to using mobile technology for academic purposes. The digital native hypothesis, that learners born amid technology are fluent in ways of a native language speaker (Prensky, 2001a), does not hold true for this population.

This study illustrated that student-athletes are comfortable using the iPad for tasks similar to that of a mobile phone—surfing the web, communicating with friends, sharing on social media and watching entertainment. That comfort, however, does not transfer into the class environment. Without clear, formalized instruction on how the iPad can be used academically, along with introduction to and training in apps that will support that academic mission, the device is considered by most student-athletes surveyed to be, at best, ineffective for academic usage. At worst, it is a distraction from academics.

**Implications for Practice**

This grounded theory study contributes to the field of study by identifying and perceptions student-athletes have about using iPad technology for academic purposes, developing a theory on how student-athletes may utilize mobile devices in their classwork (Sedlacek & Adams-Gaston, 1996). The benefits of this study will be most significant for educators who seek to utilize academic mobile technology among the college-age population, as well as athletic departments at colleges and universities that who seek to connect student-athletes with academics utilizing mobile technology.

**Contribution to student-athletes.** Division I athletes have time and attention demands imposed by their sports (Comeaux & Harrison, 2011) and are expected to spend much of their time on practices, travel, team meetings, and games, which often equates to more than 40 hours a week (Wolverton, 2008). To address the need for such support, athletic departments should develop programs tailored for student-athletes (Retig & Hu, 2016). This research shows, however, that mobile technology cannot be disseminated passively, and familiarity toward usage cannot be assumed. Comeaux (2015) advocated that universities provide to student-athletes academic support that takes into account the challenges of an athletic schedule, as well as support for athletic focus and career development. This research illustrates that academic instruction in technology is useful for all of those goals, and will help provide the external academic support needed in these areas.

**Contribution to teaching and learning with mobile technology.** This study illustrates that education practitioners would want to consider making fewer assumptions about student populations, and their comfort and desire to utilize technology for academic purposes. Use of technology in the social or entertainment sphere does not equate to an academic understanding or desire for usage. Indeed, Prensky's idea of the "digital native," who are "native speakers" of the digital language of computers and the Internet (2001a, p. 1), is a fallacy. Instead, this research indicates that student-athlete use of technology is dependent both on the expectations placed on them (Akçayır et al., 2016) and the instruction they receive. This demonstrates that academic technological instruction must become part of the curriculum for student-athletes, if technology is to be utilized in a meaningful way. Incorporation of such academic technological instruction

will advance understanding and usage of mobile technology to connect student-athletes to their learning. The research indicates student-athletes would benefit from a pedagogical shift to include such instruction.

Faculty and staff must concurrently engage in and embrace academic mobile technology if they have that same expectation of students. Without concurrent engagement, even student-athletes compelled by the potential for academic technology usage lose interest over time, and revert back to more comfortable and familiar tools.

**Recommendations for Future Research**

Future research expanding the current knowledge of student-athlete academic engagement with mobile technology can be both qualitative and quantitative research. This study can be viewed as foundational research, with future studies seeking to establish additional knowledge and insights (Creswell, 2013). Topics may focus on better understanding of student-athlete learning and academic technology usage.

A qualitative approach to future research regarding student-athlete use of academic mobile technology could address student-athlete use of academic mobile technology to compare teaching and learning methods (Creswell, 2011). The students could answer how well education efforts match student-athlete learning perceptions and experiences. Research could reveal whether or not educators utilizing mobile technology are approaching learning efforts with methods that compliment or correspond with the perceptions and experiences of student-athletes (Benham, Carvalho & Cassens, 2014).

Researchers could also take a longitudinal look at student-athlete use of mobile technology. That would enable examination of the long-term academic experiences of student-athletes using mobile technology for academics. It would allow even more detail

that would describe a student-athlete's perceptions, thoughts, actions, and academic experiences over time.

This approach could also be used to study a certain type of student-athlete, such as revenue or Olympic over a specified time period. In addition, the study could be approached with Division II or III athletes, who are a distinctly different population than Division I athletes. This type of study would offer unique data into particular populations, and expand understanding of how the academic use of mobile technology is perceived and experienced (Creswell, 2013).

A quantitative approach could also be used to further examine student-athlete use of mobile technology to determine if differences exist within academic experiences. Student-athlete ages, years in school, sport, major, socio-economic background and other factors could be compared, to examine if any were significant in determining different engagement with academic mobile technology. In addition, a correlational study could be done to determine if any relationship between factors exists. Few studies that have been done regarding student-athlete learning using mobile technology, so there are many options for future research. Both qualitative and quantitative research would expand current ideas and knowledge of the topic (Creswell, 2011).

**Concluding Thoughts**

This grounded theory study examining how student-athletes at a large Division I Midwestern university understand and utilize mobile technology for academic purposes revealed a theory, "The theory of dependent learning for academic use of mobile technology." This theory is derived from the three themes that emerged from the research data. These themes unite in describing how student-athletes perceive and experience

academic use of mobile technology. Both qualitative and quantitative approaches could continue from this research, using it as foundational knowledge. This research is a significant contribution to educating student-athletes, and the use of mobile technology in education. This research into student-athlete perceptions of and experiences with academic use of mobile technology fills a gap in current literature on learning with mobile technology, and was strengthened by the interview process involving a specific and finite population. The research contained some limitations in focusing only on student-athletes at a large Division I university in the Midwest, and this research may not be applicable to student-athletes in Division II or Division III, or smaller private schools.

Important connections were made between the conceptual framework of teaching and learning with technology, and student-athlete perceptions and experiences in using mobile technology for academic purposes. Significant comparisons were also made between the previous research and current literature. The research study both supports and contrasts findings in literature examined.

The developed theory describes how student-athletes perceive and experience academic use of mobile technology. Student-athletes, no matter what their age, are not "digital natives." They have no more inherent understanding of how to use technology for academics than any other age group or population. Instead of simply being provided mobile technology, student-athletes must be taught how to use that mobile technology for academic purposes, and be provided and be provided academic support in their learning process.

In addition, student-athletes must be provided ancillary tools to support their mobile devices within their academic efforts. At minimum, that would be an appropriate

power source. Beyond that, student-athletes need keyboards and styluses to allow their mobile devices to serve standard academic needs and purposes. They also need faculty and support personnel who are committed to working with them to incorporate mobile technology into their learning experience.

As the time constraints continue to tighten student-athlete schedules, and academic requirements for student-athletes continue to grow, mobile technology can provide connectivity, organization, and engagement opportunities. The future of academics for student-athletes will be intertwined with technology. To maximize that opportunity, training must be part of launch and integration efforts to advance academic engagement.

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# Appendices

# Appendix A

## Interview Questions

1. What is the academic purpose of mobile technology for student-athletes?
    a. Describe your feelings about using the iPad since you received it?
    b. Describe how you use your mobile technology on an average class day.
    c. Describe me your average class session—how do you take notes, interact in class?
    d. Explain the relevance of mobile technology is in your classwork.
    e. Describe how you access course materials for your classes?
2. What are student-athlete's perceptions of self-efficacy related to academic use of mobile technology?
    a. Why do you think the university athletics department gave you an iPad?
    b. What were your first thoughts when your university athletic department mentioned you would be receiving an iPad?
    c. What do you wish the university athletics department knew/understood about your feelings on the iPad that maybe it doesn't know/understand now?
    d. How much and what kind of instruction did you receive when you got your iPad?
    e. What, if any, training do you wish you had received?
3. How does use of mobile technology impact academic success for student-athletes?
    a. What is one thing you wish the device could do that it can't?
    b. What is the most useful aspect of the device for you personally?
    c. What other technology, if any, might benefit you academically?

d. Describe what tools you use to do homework in your classes?

e. Share what you like best and least about using the iPad.

Appendix B

Figures of responses

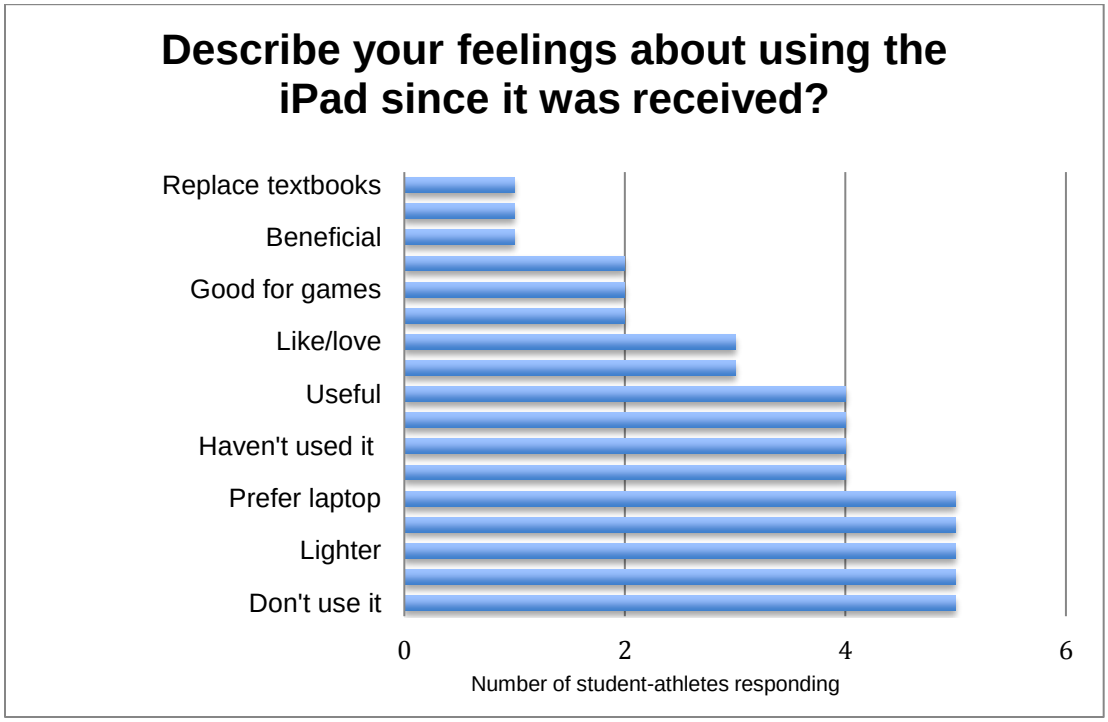


*Figure 1*. Describe feelings about using the iPad since it was received. This figure shows how student-athletes felt about the iPad after receiving it from the athletics department.

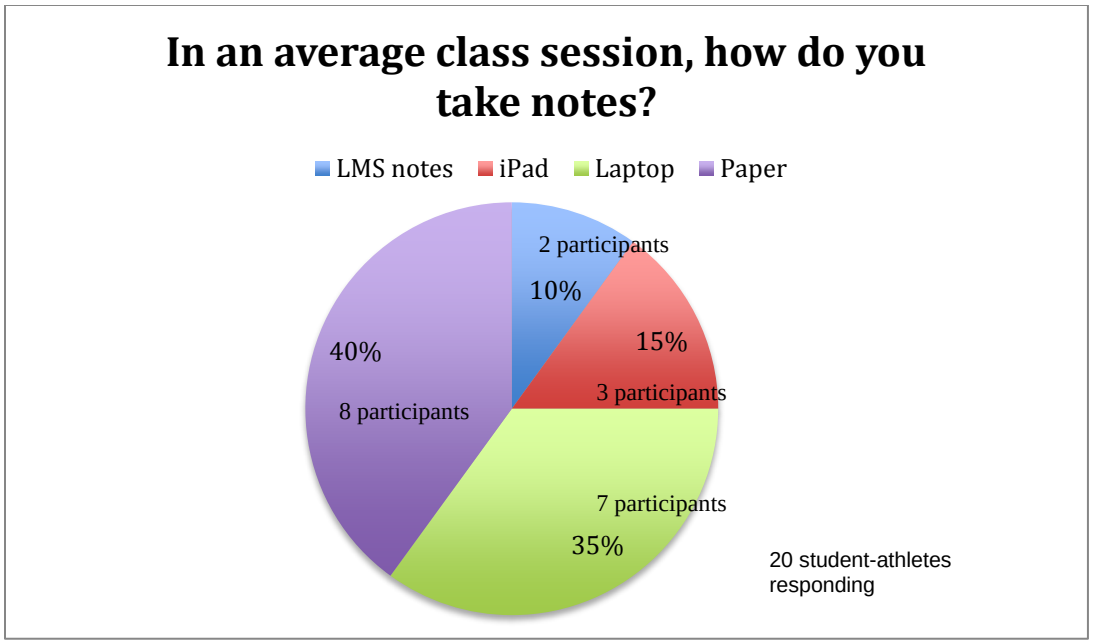


*Figure 2.* In an average class session, how do you take notes? This figure illustrates what tools student-athletes use to take notes in class.

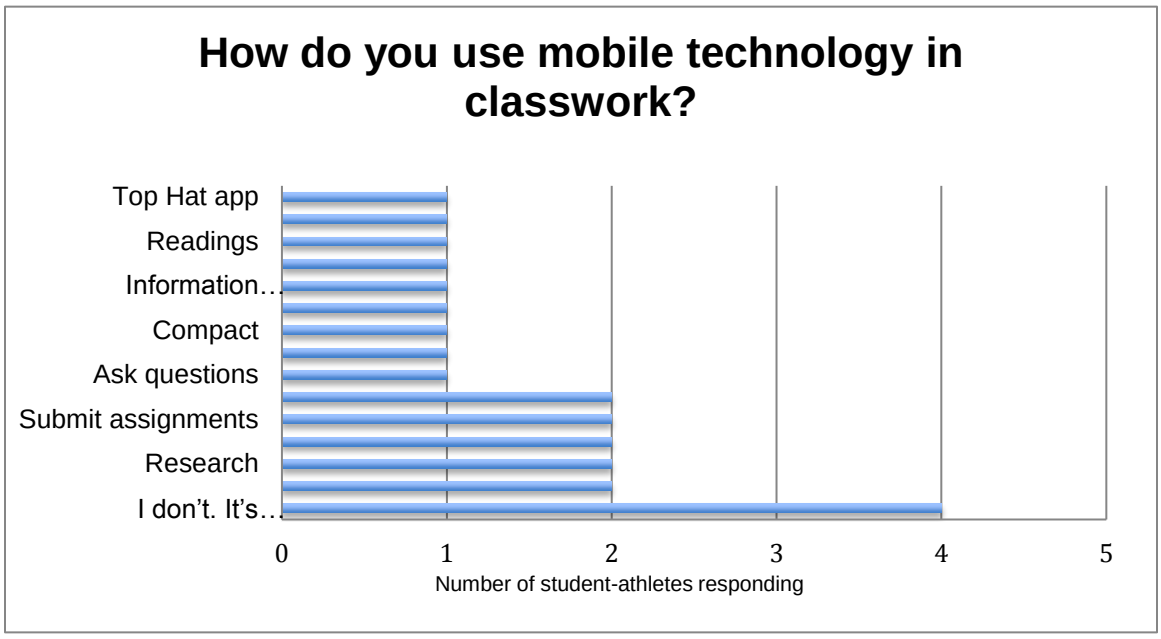


*Figure 3.* How do you use mobile technology in class work? This figure illustrates how student-athletes use their mobile technology in completing work in class.

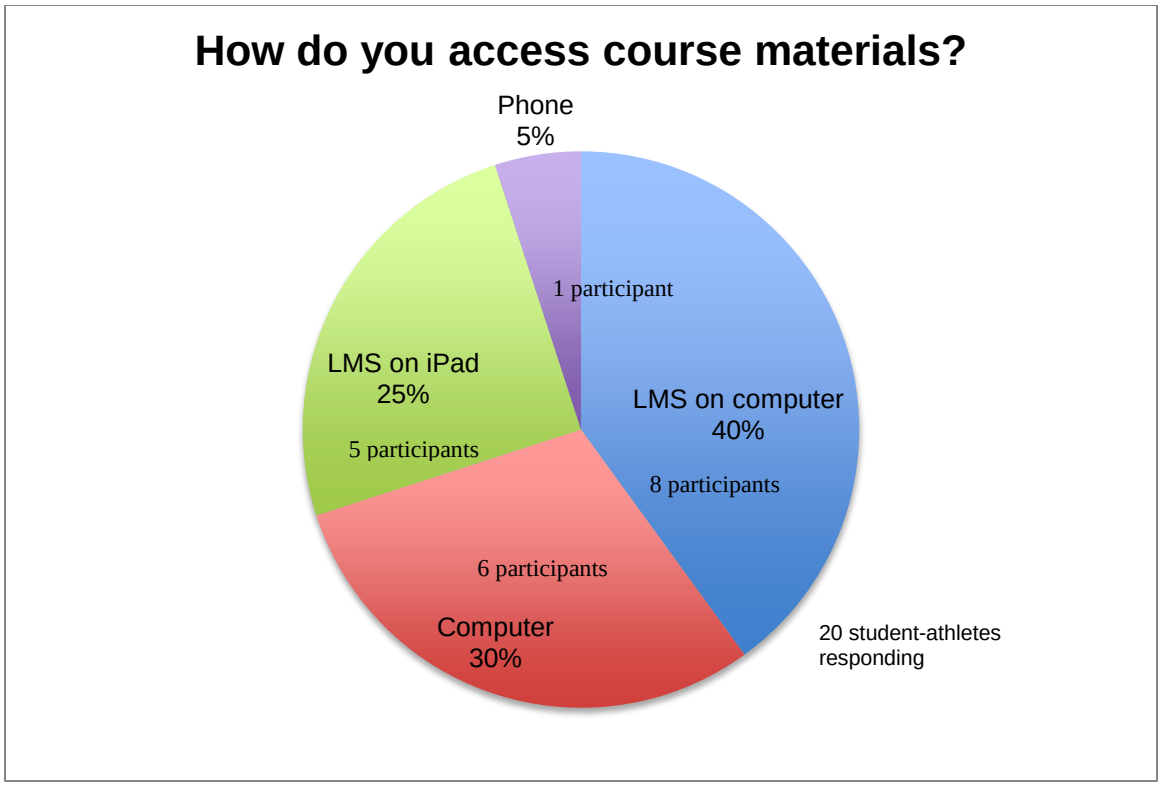


*Figure 4*. How do you access course materials. This figure illustrates which device student-athletes use to access course materials.

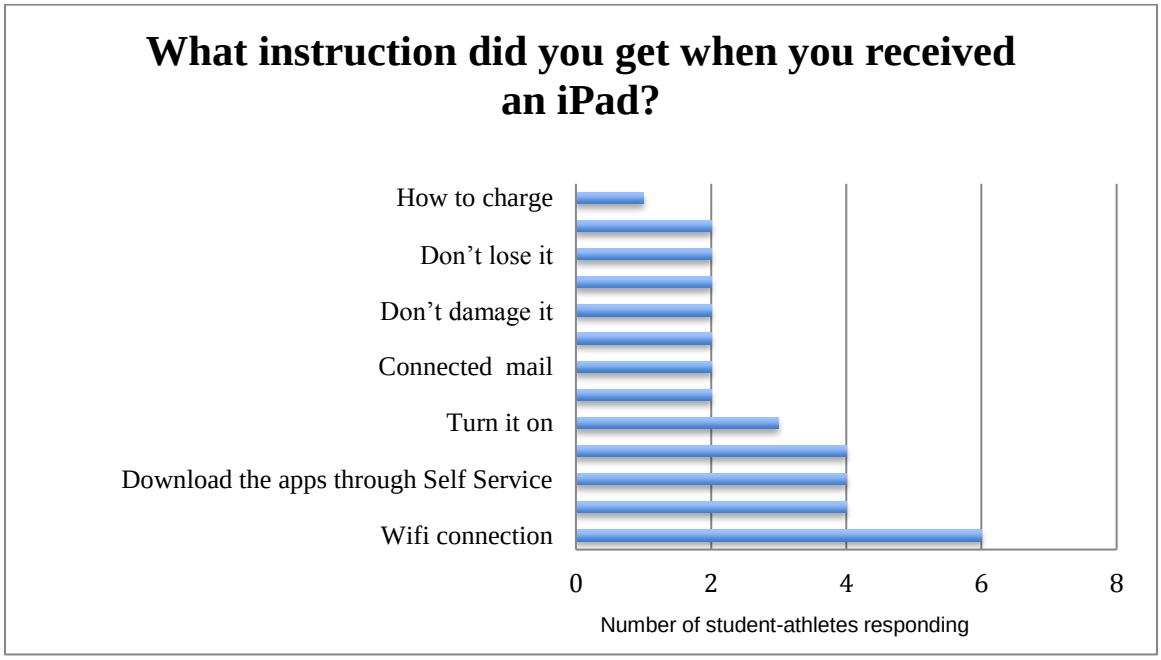


*Figure 5.* What instruction did you get when you received an iPad? This figure illustrates what training student-athletes received when they were provided the iPad.

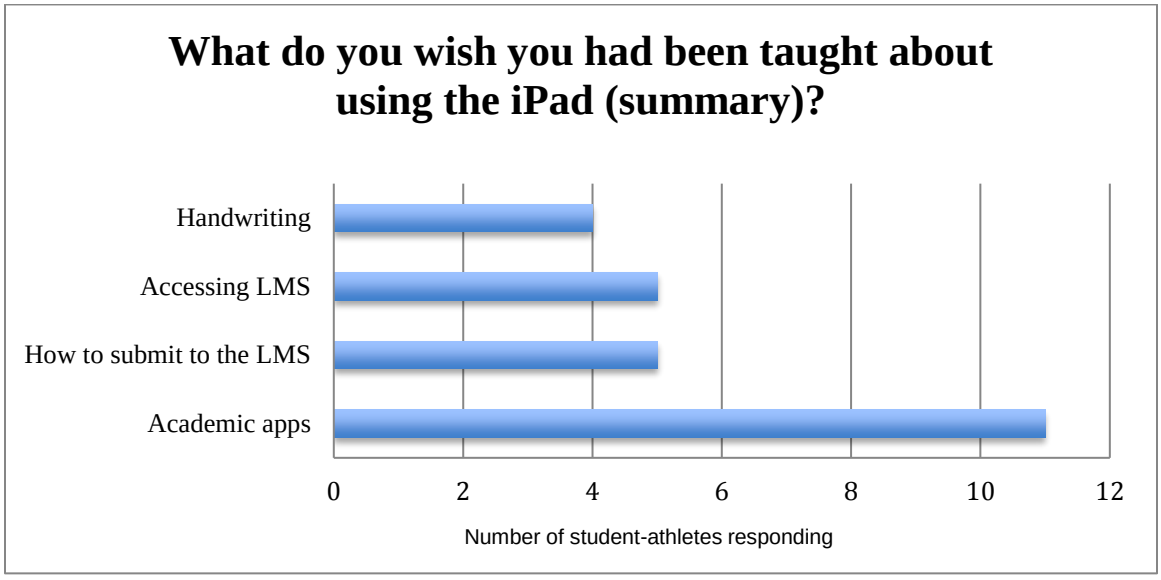


*Figure 6.* What do you wish you had been taught, if anything (summary)? This figure shows what student athletes wish they had been taught about using a mobile device in the classroom.

**What do you wish you had been taught about using the iPad (expanded)?**

- It would be neat if they provided some kind of seminar for athletes to go to, that said, "Hey, this is a great tool to boost your note taking. This is a great tool to search article databases."
- If I can get Word on an iPad.
- How to submit papers into the LMS.
- Finding the things that could be useful with it.
- Apps that helped take notes.
- How you could use it as a school resource
- What we got was fine.
- If they can have something where you can save documents onto a certain app, and take documents and submit them for assignments on Carmen. That'd be helpful for sure.
- Maybe just kind of shown what some of those apps do. That would have been helpful, cause I know that's a lot of the reason why they give them to us.
- I wish they could have showed us…certain apps that could help with school and how to set up everything more thoroughly maybe.
- Nothing.
- Specific apps.
- You're just really not going to know how to work an iPad, beyond the basics. And knowing the basics isn't necessarily enough to use it for educational purposes. Because, if no one ever told you that there are apps that you can use, For your class notes, you're just going to use the basic note that the app will provide, so but it doesn't make using the iPad that much more special.
- How to use a flash drive or something to transfer files.
- I know what I need. As long as I can access Carmen, I'm good. I'm happy. I'm content. I don't use it for anything else but Carmen and Safari
- How to download apps on it and use it in our classes.
- I wish I could write on it like a Surface.
- I wish they would have said, "We're going to show you this is how we think you should use it."
- By having someone come in and maybe teach you in a more professional way, how to use an iPad for a specific class for school, I think it was there to help students realize how much of a tool it is in classes.
- Maybe there's more graphic design stuff you can do on it.
- I don't think anybody told me specifically at least from the athletics department that campus was going to have an app.
- I really wish someone would have told me how to use it in class. I mostly have on there just the things that came on it already, because I don't know how to use anything else.

*Figure 7.* What do you wish you had been taught, if anything, about using the iPad (expanded)? This figure illustrates what student-athletes wish they had been taught about using the iPad for academics.

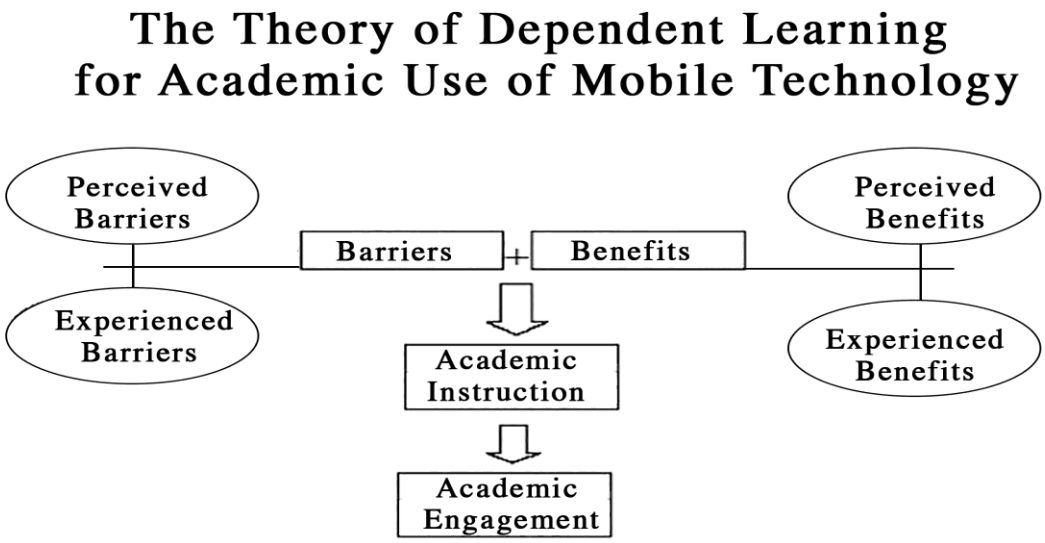


*Figure 8:* The Theory of Dependent Learning for Academic Use of Mobile Technology. This figure shows the how barriers and benefits (real and perceived) by student-athletes using mobile technology for academics can be shaped by academic instruction.

Appendix C

Research protocol

## I. Objectives

The purpose of this grounded theory study was to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and to develop a theory about how they can more effectively incorporate those devices in their academic course work. This research was conducted using recorded interviews, combined with participant observations, to identify emerging patterns. Saturation is key to theory development, and interviews will be conducted until clear and finite patterns are identified (Creswell, 2013). Development of this grounded theory involved developing and presenting a theory in a narrative format that includes reflections of the researcher, as well as anecdotal evidence from subjects. Applying the results will help focus, facilitate, and implement, use of the devices for academic purposes among student-athletes at a major Midwestern Division I university.

The following open-ended research question guided this study:

RQ1. What theory emerged from the data to describe how student athletes at a large Division I Midwestern university develop an understanding about using mobile technology for academic purposes?

The framework and questions for this study are centered on three themes: the academic uses for mobile technology, digital native learning theory, and student-athlete learning efficacy.

**II. Background and Rationale**

A grounded theory analysis will be used to better understand how student-athletes utilize mobile technology in academic purpose. The researcher selected grounded theory as the method of analysis to discover patterns in the data and help the researcher generate a theoretical model of how student-athletes use mobile technology in learning (Cresswell, 2013). The researcher developed a theory that can lead to better understanding and academic engagement with mobile technology.

A grounded theory, qualitative research design allows themes to emerge, as opposed to be predetermined (Milles et al., 2006). The development of constructivist grounded theory. *International Institute for Qualitative Methodology, 5*(1), 25-35. It can reveal the truths about student-athlete perceptions of mobile technology use for academics through extensive interviewing and memo development. The purpose of grounded theory methodology is to generate a theory through constant comparison (Kendall, 1999). Data are analyzed as they are collected, through the process of coding (Milles et al., 2006; Charmaz, 2016). Unlike quantitative research and its reliance on numbers, qualitative research seeks to understand and interpret through experiences and interviews (Denzin & Lincoln, 2005).

Organically understanding student-athlete beliefs, attitudes, and perceptions of academic use of mobile devices will inform the educational field on the impact such devices may have on student-athlete academic efficacy. This type of research will allow for discovery of views, feelings, and intentions, as well as, the contexts within the framework of the student-athlete life (Charmaz, 2006). It will allow student-athlete voices and descriptions to provide the best insights for the study (Creswell, 2013).

## III. Procedures

### A. Research Design

A grounded theory study was used to better understand how student-athletes utilize university-provided mobile technology in academic pursuits. Grounded theory is "the discovery of theory from data" (Glaser & Strauss, 1967, p. 1). The researcher elected grounded theory as the method of analysis to discover patterns in the data and help the researcher generate a theoretical model of how student-athletes use mobile technology in learning (Strauss & Corbin, 1998).

The researcher aims to develop a theory that can lead to better understanding and academic engagement with mobile technology. The researcher will use constant comparison to analyze data, and ultimately compares interpretations of that data translated into codes and categories (Milles et al., 2006). This grounds the researcher's final theory in participant experiences (Strauss & Corbin, 1998). Conceptual saturation is reached when no new categories are generated from open codes, and categories are then examined for relationships (Kendall, 1999). The integration and interrelationships of the categories form the basis of the grounded theory, which is then compared to previous literature to validate or show differences in current understanding (Kendall, 1999).

### B. Sample

Voluntary sampling will be used to select study participants from student-athletes who received an iPad from the university. An email was sent to all student-athletes seeking volunteers. Those who volunteered will be stratified into team sports to select a representative sample from as many teams and genders as possible (Creswell, 2013). All participants in this study met the following selection criteria: (a) A student-athlete

enrolled full-time at the university, (b) age 18 or older, (c) in possession of a university-provided iPad, (d) selected on a voluntary basis, (e) who have had access to the iPad for at least one full semester. Any individual who did not meet the criteria was not a part of the study sample.

The population was then divided into gender and sport, with twenty interview participants selected to represent an even gender and sport variety distribution, from those student-athletes that met the criteria and indicated an interest by signing and returning the Informed Consent Form. Criteria sampling assured participants had at least one full semester with the iPad and may or may not have been instructed in iPad usage. Each participant received and signed a copy of the informed consent form (see Appendix B). The form included background information, intent of the study, procedures, voluntary nature of the study, risks and benefits of the study, information about compensation and confidentiality, and contact information. The sample did not include any vulnerable or protected populations, or any participants under the age of eighteen. Participant identity remains confidential.

**C. Measurement / Instrumentation**

This design uses protocol questions to examine the process by which student-athletes at a large Division I Midwestern university use mobile technology for academic purposes, and identify themes to develop a theory about how they can more effectively incorporate those devices in their academic course work.

**D. Detailed study procedures**

Individual face-to-face interviews will be scheduled and conducted at times convenient for each participant. The researcher will be the only interviewer. An iPhone

and iPad will be used to record the interviews, and an iPad used to write handwritten observations and follow-up questions during the interview. Participants will be advised that participation in the study was strictly voluntary and confidential. The interviews will be transcribed for content analysis. The participants will be asked fifteen primary open-ended interview questions, augmented by prompts and follow-up questions to obtain rich descriptive data (Rubin & Rubin, 2005). The question categories will align with the study's research question and included student-athlete perceptions about academic use of mobile technology, self-efficacy in using mobile technology for academics, and student achievement using mobile technology for academics. The individual face-to-face interviews will conducted in a private area to maintain confidentiality and comfort. Participants will be advised that the individual interview would take between 20 to 30 minutes.

**E. Internal Validity**

Trustworthiness of this qualitative research study will be established through credibility, transferability, dependability, and confirmability (Creswell, 2013). Peer debriefing will be used to strengthen the validity and credibility of the study (Creswell, 2013). Methods of triangulation, and the use of interviews across a varied population will support verification and cross checking of the data (Creswell, 2013). A transparent description of the research study including an outline of the research process, raw data, the development of codes, category development, and theoretical proposals will also be available (Miles & Huberman, 1984).

**F. Data Analysis**

The interviews will be open coded to identify a set of emergent preliminary categories and their properties (Creswell, 2013). Codes will be initially broad and basic, and became more specific as data are added. The main purpose of axial coding is to conjoin data as it is identified into themes (Corbin & Strauss, 2008). Through axial coding, similar categories from the open coding process will be combined to form core categories and subcategories. Interactions and relationships between categories and subcategories will be identified (Creswell, 2013; Strauss and Corbin, 1998). This included causal relationships, contextual conditions, participants' actions and interactions, and outcomes of these actions and interactions (Creswell, 2013).

# Appendix D

## Recruitment

Recruitment Email

My name is Nicole Kraft and I am an assistant professor (clinical) in the School of Communication at The Ohio State University. I invite you to participate in a research study looking at student-athlete perceptions of iPad technology for academic purposes.

You may participate if you are **(a) a student-athlete enrolled full-time at the university, (b) age 18 or older, (c) in possession of a university-provided iPad, (d) who have had access to the iPad for at least one full semester.**

As a participant, you will be asked to participate in a 20-30 minute interview discussing your use and perceptions of your iPad for academic purposes. These interviews will take place in a site convenient to you. This research is intended to develop a theory about how student-athletes use the iPad for academics and to help guide academic iPad use in the future. We anticipate that risks of your participation are extremely minimal, but could include the possible release of your confidential information only as it relates to your participation in this study.

All responses will be anonymous and participation in this research is completely voluntary.

If you would like to participate in this research study or have questions, please respond to this email to set up an interview time.

Thank you!

Sincerely,
Nicole Kraft
Assistant Professor (clinical)

# Appendix E

## Consent

The Ohio State University Consent to Participate in Research

Study Title: Athletes and iPads

Principal Investigator: Prof. Nicole Kraft

You are being asked to volunteer for this qualitative research study. This study is being conducted to better understand student-athletes' use of iPad technology in academics. You are being asked to participate because you are a student-athlete and have received an iPad.

**Subject rights:** This survey involves research. Your participation is voluntary, *and* you may withdraw at any time without penalty or loss of benefits. If you decide to participate, you may decline to answer any question and you may choose to withdraw at any time.

**Purpose of the study:** You are being asked to participate in qualitative interviews so we can better understand students-athlete's academic use of iPads. By participating in these interviews, your responses will be used to inform training and support of other student-athletes in using iPad technology for academics.

**Risks and benefits:** There are no anticipated risks or benefits for participating in this study.

**Study tasks or procedures:** If you agree to participate in this study, **y**ou will be asked to take part in an interview, where you will be asked questions about your iPad use

in academics. You will also be asked to provide some basic demographic information about yourself, but no personally identifying information will be tied to your responses.

**Duration of subject's participation:** This survey should take approximately 20-30 minutes to complete.

**Confidentiality:** Interview data that does not contain identifying information will be collected on an encrypted website and stored on password-protected computers in locked laboratory rooms. Only authorized personnel will have access to these data and only for research purposes. No guarantee of Internet survey security can be given as (although unlikely) transmissions can be intercepted and IP addresses can be identified. In all analyses and any possible published reports no information will be included that would identify any individual participant. There are organizations that may inspect and/or copy your research records for quality assurance and data analysis, including the Institutional Review Board at Ohio State University, the Office for Human Research Protections, or other federal state, or international regulatory agencies.

**Contacts and Questions:**

If you have any concerns of complaints about this research, please contact Principal Investigator Prof. Nicole Kraft via phone at 614-247-6274, via email at kraft.42@osu.edu, or in person at 154 N Oval Mall, Columbus, OH 43210.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

**Consenting to Participate:**

I have read this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

NAME DATE

- [ ] I agree to participate
- [ ] I do not wish to participate

Appendix F

Site letter

The Ohio State University
John Davidson, Davidson.92@osu.edu

23 April 2018

Dear Lamar IRB,

Based on my review of the proposed research by Nicole Kraft, advised by Diane Mason, I give permission for him/her to conduct the qualitative study entitled "Academic Use of Mobile Technology by Student-Athletes at a large Midwestern University." As part of this study, I authorize the researcher(s) to collect responses via interviews from our student-athletes. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include providing access to student-athletes and that the research will include an in-person interviews. We reserve the right to withdraw from the study at any time if our circumstances change.

This authorization covers the time period of Sept. 1 to Jan. 8.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Ohio State IRB.

Sincerely,

John Davidson
Ohio State Faculty-Athletics Representative
Davidson.92@osu.edu
614-378-1562

# Appendix G

# Lamar IRB

**Saturday, February 10, 2018 at 4:19:39 PM Eastern Standard Time**

**Subject:** IRB-FY18-1 - Initial: Initial - Expedited - Approved
**Date:** Sunday, September 17, 2017 at 11:00:04 PM Eastern Daylight Time
**From:** no-reply@irb.app.lamar.edu
**To:** ddmason@lamar.edu, nkraft@lamar.edu

Sep 17, 2017 10:00 PM CDT

Diane Mason
Nicole Kraft

Re: Expedited - Initial - IRB-FY18-1 Understanding Academic Use of Mobile Technology by Student-Athletes at a Large Division I Midwestern University: A Qualitative Study

Dear Dr. Diane Mason
Nicole Kraft

Lamar University Human Subjects Review Board has rendered the decision below for Understanding Academic Use of Mobile Technology by Student-Athletes at a Large Division I Midwestern University: A Qualitative Study.

Decision: Approved

Selected Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Study Expiration: Sep 17, 2018

Please make timely submission of renewal or closure to your study. Remember to obtain approval from the Institutional Review Board before instituting any changes to the study.

Sincerely,
Lamar University Human Subjects Review Board 

# Appendix H

## CITI Training

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)**
**COMPLETION REPORT - PART 1 OF 2**
**COURSEWORK REQUIREMENTS***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Nicole Kraft (ID: 3576906)
- **Email:** kraft.42@osu.edu
- **Institution Affiliation:** Ohio State University (ID: 369)

- **Curriculum Group:** Human Research
- **Course Learner Group:** Social and Behavioral Research
- **Stage:** Stage 2 - Refresher Course 101

- **Report ID:** 18734871
- **Completion Date:** 16-Apr-2016
- **Expiration Date:** 16-Apr-2019
- **Minimum Passing:** 80
- **Reported Score*:** 85

| REQUIRED AND ELECTIVE MODULES ONLY | DATE COMPLETED | SCORE |
|---|---|---|
| SBE Refresher 1 – Instructions (ID: 943) | 16-Apr-2016 | No Quiz |
| SBE Refresher 1 – History and Ethical Principles (ID: 936) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Federal Regulations for Protecting Research Subjects (ID: 937) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Informed Consent (ID: 938) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Defining Research with Human Subjects (ID: 15029) | 16-Apr-2016 | 1/2 (50%) |
| SBE Refresher 1 – Privacy and Confidentiality (ID: 15035) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Assessing Risk (ID: 15034) | 16-Apr-2016 | 1/2 (50%) |
| SBE Refresher 1 – Research with Prisoners (ID: 939) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Research with Children (ID: 15036) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Research in Educational Settings (ID: 940) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – International Research (ID: 15028) | 16-Apr-2016 | 1/2 (50%) |
| Ohio State University (ID: 780) | 16-Apr-2016 | No Quiz |

**For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.**

**Verify at**: https://www.citiprogram.org/verify/?c085e61c-17c5-46c4-b35a-1fc08fcc7188

**CITI Program**
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

# COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

## COMPLETION REPORT - PART 2 OF 2
## COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Nicole Kraft (ID: 3576906)
- **Email:** kraft.42@osu.edu
- **Institution Affiliation:** Ohio State University (ID: 369)

- **Curriculum Group:** Human Research
- **Course Learner Group:** Social and Behavioral Research
- **Stage:** Stage 2 - Refresher Course 101

- **Report ID:** 18734871
- **Report Date:** 01-Nov-2016
- **Current Score**:** 85

| REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES | MOST RECENT | SCORE |
|---|---|---|
| SBE Refresher 1 – History and Ethical Principles (ID: 936) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Federal Regulations for Protecting Research Subjects (ID: 937) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Informed Consent (ID: 938) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Research with Prisoners (ID: 939) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Research in Educational Settings (ID: 940) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Instructions (ID: 943) | 16-Apr-2016 | No Quiz |
| Ohio State University (ID: 780) | 16-Apr-2016 | No Quiz |
| SBE Refresher 1 – International Research (ID: 15028) | 16-Apr-2016 | 1/2 (50%) |
| SBE Refresher 1 – Defining Research with Human Subjects (ID: 15029) | 16-Apr-2016 | 1/2 (50%) |
| SBE Refresher 1 – Assessing Risk (ID: 15034) | 16-Apr-2016 | 1/2 (50%) |
| SBE Refresher 1 – Privacy and Confidentiality (ID: 15035) | 16-Apr-2016 | 2/2 (100%) |
| SBE Refresher 1 – Research with Children (ID: 15036) | 16-Apr-2016 | 2/2 (100%) |

**For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.**

**Verify at**: https://www.citiprogram.org/verify/?c085e61c-17c5-46c4-b35a-1fc08fcc7188

**Collaborative Institutional Training Initiative (CITI Program)**
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

# Biographical Note

Nicole L. Kraft graduated from Harbor High School in Santa Cruz, Calif., in 1985. She attended Temple University and received her Bachelor of Science in Political Science in 1992. She worked as a newspaper reporter and editor, as well as a communication professional and magazine editor, before she attended The Ohio State University to pursue her Master of Communication Degree, which she received in 2003. She joined the Ohio State faculty in 2010 and became an assistant professor (clinical) in 2012. She was accepted into the 2016 Doctoral Cohort at Lamar University, where she earned a Doctorate of Education in Educational Leadership with a Concentration in Education Technology in 2018. Currently, she continues to serve as an assistant professor (clinical) of journalism at Ohio State University, and director of the university's Sports and Society Initiative.

Style manual designation: *Publication Manual of the American Psychological Association, Sixth Edition*

Typist: Nicole L. Kraft